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Experimentation-driven development and learning in organisations

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Advisor: Satu Rekonen, Lic.Sc (Tech.) and M.Sc.(Econ.)

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ABSTRACT OF
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Current unpredictable, complex and uncertain business environments require ability from both organisation and its employees to adapt to changes in creative ways that support learning. Together with creative performance, organisations that are able to learn faster than rivals and are thus better at adapting to changes in business environments are claimed to gain better competitive advantage. Therefore need for non-predictive approaches for developing that support learning and growth in organisational and individual level exists.

This thesis studied what kinds of factors affect on experimenting behaviour of an employee and how experimentation-driven development can be supported in organisation. In addition, experimentation-driven development as a tool for learning was studied.

Case study method was used in the study where client organisation was instructed to apply experimentation-driven approach during a six-week experimentation challenge aiming for employees to create novel ideas to develop their work and rapidly experiment those ideas. To study the factors affecting experimentation behaviour, an interpretive approach together with thematic analysis was used. The data consisted of 14 semi-structured interviews.

Analysis of the data resulted in two classes: factors having affects on experimentation behaviour of an employee and how experimenting affects an employee. First class consists of five categories including leadership, team, individual and structural perspectives and the gap between an idea and experimentation. Second class consists of two categories: emotional perspective of experimenting and learning.

Experimentation behaviour is likely to be supported by assuring safe environment for experimenting, supportive leadership behaviour, allocating resources for experiments and carefully designing experiments.

This thesis was done as a part of the two-year MINDexpe research project, undertaken by the MIND research group of Aalto University and funded by Tekes. MIND studies how through experimentation strategic innovations can be created.

Keywords: Organisational development, learning, creativity, experimentation-driven development, experience of experimenting

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Nykyiset ennalta arvaamattomat, monimutkaiset ja epävarmat ympäristöt vaativat sekä organisaatiolta että työntekijöiltä kykyä mukautua muutoksiin luovilla tavoilla, jotka edistävät oppimista. Luovan ongelmanratkaisun lisäksi organisaatiot, jotka oppivat kilpailijoitaan nopeammin ovat parempia mukautumaan yritysselämän muutoksiin ja saavuttavan parempaa kilpailuetua. Näin on syntynyt tarve organisaation kehittämisen lähestymistavoille, jotka eivät pyri ennustamaan tulevaa, vaan tukevat organisaation sekä yksilön oppimista ja kasvua.

Tässä diplomityössä tutkittiin minkälaiset tekijät vaikuttavat työntekijän kokeilevaan käyttäytymiseen ja miten kokeilemalla kehittämistä voidaan tukea organisaatiossa. Lisäksi kokeilemalla kehittämistä oppimisen välineenä tutkittiin.

Tutkimuksessa käytettiin case-tutkimusta, jossa asiakasorganisaatio tutustutettiin kokeilemalla kehittämiseen kuuden viikon kokeilukilpailun kautta. Kilpailun tarkoitus oli luoda uusia ideoita työn parantamiseksi ja kokeilla niitä nopeasti. Tulkitsevaa tutkimusta yhdessä temaattisen analyysin kanssa käytettiin tutkimaan tekijöitä, jotka vaikuttavat kokeilemalla kehittämiseen. Empiriinen materiaali koostui 14 puolistrukturoidusta haastattelusta.

Empiirisen datan analyysi johti kahteen luokkaan: tekijät, jotka vaikuttavat työntekijän kokeilevaan käyttäytymiseen ja kuinka kokeileminen vaikuttaa työntekijään. Ensimmäinen luokka koostu viidestä kategoriasta, johtajuuden, tiimin, yksilön ja rakenteiden näkökulmasta. Toinen luokka sisältää kaksi kategoriaa: kokeilemisen tunnekokemuksen sekä oppimisen.

Kokeilevaa käyttäytymistä voidaan tukea varmistamalla turvallinen ympäristö kokeilemiselle, kokeilemista tukevalla johtamisella, varaamalla riittävästi resursseja kokeilulle sekä huolellisella kokeilujen suunnittelulla.

Tämä diplomityö tehtiin osana Aalto-yliopiston MIND-tutkimusryhmän kaksivuotista MINDexpe-tutkimushanketta, jonka rahoittaja oli Tekes. MIND tutkii miten kokeilemalla voidaan synnyttää strategisia innovaatioita.

Asiasanat:	Organisaatiokehitys, oppiminen, luovuus, kokeilemalla kehittäminen, kokeilemalla kehittämisen kokemus
Kieli:	englanti

Esipuhe

Miten kaikki alkoi / siitä olisi paljon / mutta jätetään se nyt

Tätä työtä tehdessäni olen kyseenalaistanut paljon, enkä vähiten itseäni, painovoimaa ja oikeaoppisen vihannestenpilkkomistavan tärkeyttä. Esikoiskirjani oli määrä olla vuoroin taideteos, vuoroin maailman pelastava oivallus, jonka formaatti vaihteli videosta nelipolviseen trokeehen. Vaan heräsipä minussakin mustakantisesta perusteoksesta haaveileva teekkari, joka oppi, ettei tämä työ ole koskaan valmis.

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Helsinki, Tammikuu 2015

Marianne Tenhula

Contents

1 Introduction

This chapter is an introduction for the thesis. It first outlines the background for the study, then presents research objectives and motivation for the study. In the last section, structure of the thesis is presented.

1.1 Background

Fierce competition for market share and urge for technological innovations have increased the pace of change leading organisations in high pressure to adapt to new business environment, rearrange resources, understand and meet new customer and business environment demands. (Andriopoulos and Lowe, 2000) Wide access to the information has put tremendous pressure on today's business and companies to increase their efficiency and effectiveness and to develop novel products and processes. Simultaneously, budgets are squeezed and margins of profit grow smaller. (Andriopoulos and Lowe, 2000; Oldham and Cummings, 1996) Short time horizons require companies to stay in continuous stream of quarterly profits, oftentimes at the cost of long time benefits. Especially large companies easily favour narrow-minded actions such as quick marketing fixes, cost cutting and acquisition strategies over systemic thinking and process, product or quality innovations. (Quinn, 1985)

Current economy is, however, driven by innovation and innovativeness, requiring new understanding and abilities to generate great ideas (Amabile and Khaire, 2008). Conventional business consists of repetition, avoiding risks and focusing on business outcomes (Buijs, 2007), whereas innovation requires novel solutions, thinking out of the box, risk-taking, breaking the rules, challenging the status quo and questioning the future (Burns and Stalker, 1961; Kanter, 1984; March, 1991). Employees who are able to produce competitive ideas are precious for organisations striving for innovativeness (Andriopoulos and Lowe, 2000; Oldham and Cummings, 1996). Various studies recognise creativity influencing on performance and survival of the company across variety of tasks, occupations and industries (Hennessey and Amabile, 1988; Amabile and Khaire, 2008; Jung et al., 2003; Mumford et al., 2002) and Shalley and Gilson (2004) argues creative employees create competitive advantage in the business field. According to Hennessey and Amabile (1988), individual creativity stands for an essential building block for organisational

innovation (Hennessey and Amabile, 1988) and is essential in new idea generation and design processes that aim for innovative solutions (Sethi et al., 2001). The significance of creativity lays in its first step in creating something novel, whereas innovation refers to the implementation phase of the novel ideas in individual, team or organisational level (Shalley and Gilson, 2004; Amabile et al., 1996; Mumford and Gustafson, 1988).

Understanding change analytically and from systems perspective in the turbulent world appears challenging, with the need of different skills and strategies than before. However, adapting to change and tolerating uncertainty are keys to successful organisation. (Senge, 1990) According to Edmondson (1999), reflection and learning are critical in order to understand the circumstances of increased uncertainty and complexity, pace of change and decreased job security in future organisations. According to Geus (1997) to maintain company's competitive advantage company needs to to learn faster than rivals. Current and future business environment requires continuous learning from organisations, meaning deploying the collective knowledge, skills and creative efforts of their employees (Dess and Picken, 2001).

When dealing in this unpredictable, complex and uncertain environments, traditional ways for developing and innovation are not efficient, tend to take lot of resources and are too specification-driven, where specifications of the product or serviced are locked in the beginning of the project. Need for non-predictive approaches for development that support learning and growth in organisational and individual level occurs. (Thomke, 1998; Tuulenmäki and Välikangas, 2011)

Concurrently current business is remarkably dependent on services, yet innovation techniques and processes still focuses on products. Systematic learning methods are needed in order to avoid occasional successes and provide more stable base for consistency and productivity of service development. (Thomke, 2003)

In recent years the centre of innovation discussion in management and business literature have shed light on the concept of early, rough and iterative experimentation process models on innovation (Thomke, 1998; Tuulenmäki and Välikangas, 2011). In this thesis, experimentation-driven approach for development is presented as a method for learning and building competitive advantage in an organisation. It refers to an iterative trial-and-error process, where final product is developed through test and feedback -loop. Through experimenting essential factors concerning the final product are revealed before too much resources are spent, and through iterations success can be reached both earlier and faster. In addition to product development, experimentation can be applied to service design and development. (Thomke, 2003)

So far little research has been made about factors that support experimentation from organisational level. However, various studies consider behaviours such as learning, creativity, information seeking and other interpersonally risky yet organisationally favourable behaviours as predictors for experimentation behaviour (Lee et al., 2004; Amabile et al., 1996; Argyris, 1994; Edmondson, 1996; Edmondson, 2003). For instance, Amabile et al. (1996) found relation between creativity and organisational culture, reward system, encouragement from leaders, trust and resources. Likewise, feedback, asking for help and information as well as solution-oriented behaviour can all be supported through organisational norms, open leadership and shared trust(Ashford and Northcraft, 1992; Ashford et al., 1998; Lee, 1997; Morrison, 1993).

1.2 Research objectives

The objective for this study was to reveal factors affecting experimentation behaviour in organisations and shed the light on how experimenting affects an individual. In addition the aim was to study the experimentation-driven approach as a method for learning in organisations and identify how this approach could be supported in organisations.

Research questions this thesis aims to answer are presented below.

1. What kinds of factors affect on experimenting behaviour of an employee?
2. How experimenting affects an individual?
3. How can experimenting behaviour be supported in organisations?
4. How can experimentation support organisational learning?

First research question is answered through theoretical research and empirical findings. When talking about new-value creation and innovation, creativity comes to the topic constantly. Thus, in this study, perspectives of creativity are also presented together with arguments of innovation. As experimentation-driven development has not been widely studied, important findings from interviews on experimenting in an organisation are gained.

The objective for the second research question is to shed light on the experience of experimenting in order to better understand how experimentation could be better supported in organisations. Experimenting seems to affect an individual differently than planning-based developing, and requires different

skills, attitude and motivation. This question is to study how experimenting actually affects an individual.

Third research question aims to reveal factors for organisations to support experimenting behaviour of employees. This is the most practical research question of the thesis aiming to provide clear guidelines for organisations, based on theoretical and empirical findings of the study.

As organisational learning and organisations capabilities to quickly adapt to changing business environments and customer needs are essential in current and future organisations, need for new tools and methods to support learning are required. Last research question studies whether experimenting can be seen as such a tool and how experimenting could help organisational learning.

1.3 Motivation for the study

The motivation for this study raises from author's enthusiasm to learn how to support employees to become more autonomous, find excitement in their own work and assist in learning and acquiring novel perspectives. As employees know their work and customer interface oftentimes a lot better than top-management, novel approaches are needed to make the best out of employees professionalism in their own work. Author finds remarkable value in the experimentation approach, and through this study she was able to learn more about its effects on employees as well as how to support experimentation in organisations.

The thesis was written as a part of a two-year research project called MINDexpe studying experimentation-driven innovation at MIND research group, Aalto University. MIND operates under the Business, Innovation and Technology (BIT) research centre, which is a part of Department of Industrial Engineering in Aalto University School of Science. MIND research group is based on Aalto Design Factory. Tekes-funded MINDexpe project studies innovation and development in established organisations through experimentation-driven approach. In MINDexpe client organisations are tasked to use the experimentation-driven approach instead of more traditional planning-based approaches to development. The larger aim of the MINDexpe project is to widen the understanding of experimentation-driven innovation itself.

The key motivation for Mind research group is to study how and why some business ideas or businesses work better than others, how new-value can be created and strategic innovations emerged. Mind approaches these broad questions through three agendas. First of all, in order extraordinary

innovations to emerge, great ideas are needed. Thus, in the interest of MIND is to find methods and tools for improving the quality of ideas.

Leader of the research group Anssi Tuulenmäki states how new value cannot be planned, it needs to be developed through experimenting. Thus, second agenda of MIND is to study experimentation-driven development and its impacts on organisational and individual level. Experimenting is mainly described and used as a tool for developing, creating something new. This thesis focuses on this second agenda of the MIND group, and deepens the understanding of how experimenting can be used as tool for learning and creates a synthesis on organisational conditions in which experimenting is likely to happen.

Third agenda of MIND relates to organisational structures and networks, aiming to understand the essence in structures and utilise that to create the most simple organisational structures supporting business.

1.4 Structure of the thesis

First chapter briefly introduces background, research objectives and motives for the thesis.

Chapters 2, 3 and 4 form the theoretical basis for the thesis, and chapter 5 with chapter 6 present the empirical part of the thesis.

In current and future organisations in order to create competitive advantage, focus will be on organisations who learn faster than rivals. Additionally, creative ideas of employees has been related to improve competitive advantage for companies. Thus, in the chapter 2 organisational learning is presented, together with introduction to creative aspects. Behind every successful innovation, product or service stands an individual employee or a team with a great idea, so individual and team perspectives on learning are described, as well as conditions that support it.

Chapter 3 presents experimentation-driven approach for development. Understanding of experimenting and experimentation process is formed, which is the focus of MIND research group. Furthermore, this chapter provides insights on occasions when experimentation-driven approach should be adapted as a way of developing and creating something new. Experimentation-driven developing works best when uncertainty is high and under development is a process with many unfamiliar factors. Experimenting stands as a method to learn on the way of the development process; through iterative experiments and reflection better products, services and ways of working are formed.

Chapter 4 outlines factors affecting experimentation behaviour in organisations based on literature on innovation, creativity, and organisational man-

agement and behaviour. It provides understanding how through organisational conditions creative actions of employees, willingness to conduct experiments and courage to say out ideas can be fostered.

Chapter 5 presents the research design, including surroundings, case company description and methodology used in the study. It clarifies the experimentation challenge organised for the case company, explains data gathering methods and sheds light on the data analysis process.

In chapter 6, the results of the data are presented. Two main classes were recognised from the data: factors affecting experimentation behaviour and how experimenting affects an individual.

Chapter 7 consists of the discussion, where implications of the results are analysed. Furthermore, practical implications and suggestions for future research are presented. In addition, reliability of the thesis is analysed.

2 Learning and creativity in organisations

"The organisations that will truly excel in the future will be the organisations that discover how to tap people's commitment and capacity to learn at all levels in an organisation." (Senge, 1990)

Everyday problem-solving and immediate reactions to situations at hand are often related to performing instead of learning. Furthermore, long-term adaptations to our previous experiences and beliefs is mainly considered as developing, not learning. Yet, when talking about development and developing in individual, team or organisational level, the question highly concerns and is related to learning. (Kolb et al., 1984)

In order to support growth and learning in organisational and business levels, the learning process needs to be understood all from organisational, team and individual perspective (Buijs, 2007). In this chapter, learning is first outlined in organisational level, following individual and team perspectives. Furthermore, concept of a learning organisation and its building blocks are presented.

Uncertain and unpredictable problems and business requires creativity and innovation abilities of organisations and its employees. Thus, this chapter also describes aspects of creativity of an individual and outlines factors to support creativity of employees.

This chapter forms the basis and background for the next chapter, which introduces experimentation-driven development process as a tool for innovation, developing and learning.

2.1 Organisational learning

Generally organisations are considered as machines, yet recently more emphasis has been put on organisations as living organisms. When considered as a machine, organisational model is mechanic and simple, which purpose is to gain profit. Organisation as a living organism refers to a whole-systemic model, where employees find meaning in their work and are able to grow. Liable vision of the future and this thesis focuses on the latter perspec-

tive of organisations, where learning and renewal form the essence of being. (Geus, 1997) Also according to Edmondson (1999), learning is an essential concern in the fast-paced working environment, where organisational change and complexity are increasing.

Organisational learning is approached conventionally from two different perspectives in the literature. On the one hand, learning is considered as an outcome, and on the other it is considered as a process (Edmondson, 1999). In the first perspective organisational learning is referred to be *"an outcome of a process of organisations encoding interferences from history into routines that guide behaviour"* (Levitt and March, 1988), whereas process perspective defines learning as a process of continuous trial and error (Argyris and Schon, 1978). In this thesis, learning is considered as the latter tradition of learning, which allows growth and improved performance of individuals and organisations.

Educational philosopher John Dewey has conceptualised learning as a process in his writings about inquiry and reflection (Dewey, 1956). His work has influenced remarkably on following learning theories, such as experiential learning theory (Kolb et al., 1984) or action approach of organisational learning (Schön, 1983). According to Dewey (1956) learning is an iterative process consisting of designing, carrying out, reflecting upon and modifying actions. Dewey separates learning from humans' tendency to behave habitually or automatically. Edmondson (1999) builds to this definition focusing on the group level of learning and defining it as an ongoing process where reflection and action occur. Integral characteristics of learning process are asking questions, seeking for feedback, performing experiments and reflecting on the results, having discussions about errors and surprising or unexpected outcomes of actions.

According to March (1991) learning consists of exploitation, exploration and adaptation. Exploitation refers to refinement and extension of competences, technologies and paradigms that already exist, whereas exploration is about experimentation with new approaches and alternatives. When results and returns of exploitation are often positive, proximate and predictable, returns of exploration are uncertain, distant and usually negative. Therefore, exploration leads to greater locus in learning and realisation of problems than exploitation, when considered the distance in time and space. (March, 1991)

Accordingly, in management literature learning is considered relating and even being dependent on receiving feedback (Schön, 1983), discussion and failure (Sitkin, 1992) and experimenting (Henderson and Clark, 1990). As relevant information about performance is acquired through errors, discussion about them has been related with organisational effectiveness (Sitkin, 1992). According to Huy and Mintzberg (2003) organisations learn best through

small experiments and trying out new things, and the closer and more related experimentations are to customers and customer interfaces, the more can be learned.

Organisational learning research puts emphasis on cognitive and interpersonal variables when explaining effectiveness in teams and individuals, where it can also be also explained through organisation and team structures (Edmondson, 1999). For instance, Argyris (1993) has argued how individual's negative beliefs about communication and interaction may inhibit learning behaviour and lead to ineffective working in an organisation.

According to March (1991) learning is a significant factor in improving organisational performance and strengthening competitive advantage. Accordingly, it is the essence of developing and innovation; Buijs (2007) even claims all innovation processes are processes for organisational learning. Also (Quinn, 1985) argues how especially from the management perspective major innovations should be considered as incremental and interactive learning processes driven by certain goal.

2.2 Experiential learning on individual level

Various perspectives and definitions for learning has been studied, presented, analysed and utilised in order to understand individual's process of adapting new information and skills. Experiential learning theory refers to learning as a process of knowledge-creation through experiences while experiential learning process stands as a way to describe the central process of human adaptation to the social and physical environment - a holistic adaptation process that provides bridges across life situations and acts as a base for the lifelong process of learning. (Kolb et al., 1984). Also Jung (1923) argues how learning involves concept of human being as a whole - from feeling and thinking to perceiving and behaving.

Experiential learning theory of Kolb et al. (1984) consists of four elements: experience, perception, cognition and behaviour. Immediate experience forms a basis for reflection and observation, following assimilation to a theory from which new implications for action are deducted. In order to create new experiences, these implications serve as guides. Overall, experience of an individual is a focal point of learning giving personal meaning to abstract concepts, which can be afterwards shared with others. Furthermore, receiving feedback serves a continuous process for goal-oriented action following evaluation of that action. Feedback can thus boost effective, goal-oriented learning process. (Kolb et al., 1984)

Continuing with the model of Kolb et al. (1984), instead of conceiving

learning in terms of outcomes, it should rather be conceived as a process. Ideas are not fixed and immutable elements of thoughts, but can be formed and re-formed through experience. Furthermore, bringing the experiential learning into educational implications, all learning can be considered as re-learning. Thus, all learning situations should take into account people arriving from all different experiential backgrounds to what they build their new experiences and knowledge on. This partly explains resistance to new ideas, as when new information and experiences are in contradiction to old beliefs and experiences, new ideas and information is more difficult to adapt. In the education process learner's old beliefs and theories should be brought out, examined and tested, following integration of the new models and refined ideas into learner's belief systems. (Kolb et al., 1984)

Kolb et al. (1984) presents Piaget's interactive process approach to learning, according to which individual learning and adaptation of new ideas occurs through integration or substitution. Integration leads to stronger part of learner's conception of the world, whereas substitution requires real questioning of previous conceptions, and thus might take longer for the learner to adopt. Learning is a mutual process between accommodation of concepts or schemas to experiences around us and assimilation of events and experiences into existing concepts and schemas. This intelligent adaptation, learning, results from the tension between accommodation and assimilation. Through this tension growth and higher-level cognitive functioning occurs.(Kolb et al., 1984)

According to Kolb et al. (1984), learning is a process filled with tension and conflict, and new knowledge, skills and attitudes are achieved through experiential learning, which consists of four modes and required abilities of learners: concrete experience abilities, reflective observation abilities, abstract conceptualisation abilities and active experimentation. Individuals must openly involve themselves in new experiences, reflect and observe them from various perspectives, create concepts that can be integrated into more abstract theories as well as they need to be able to use these reflections and theories in active daily decision-making and problem-solving.

2.3 Team learning and performance

According to Hammer and Champy (1993) role of employees is changing to more autonomous performing multi-dimensional knowledge work rather than simple and detailed tasks under strict control, and organisational structure is changing from functional departments into process teams. This together with fast-pace environment requires organisations to enhance the ability of

teams to learn and create safe environment for learning. Thus, pressure on managers to understand and enhance team efficiency, work and learning has increased. (Edmondson, 1999)

Work team refers to small group of people that exist within the context of a larger organisation, members share understanding of being a member of the team and its tasks, responsibility for a product or a service a team is working on (Hackman, 1987; Alderfer, 1983) as well as its performance (Edmondson, 1999). Additionally, team members have supplementary knowledge and abilities compared to each other, and they share a goal, targets and ways of working and approach (Edmondson, 1999). According to Katzenbach (1993) great team performance consists of continuous work of shaping a common purpose, agreeing on performance goals, defining a common working approach, developing high level complementary skills and being transparent on the results. He emphasises that through disciplined actions groups transform to teams and argues how demanding schedules, long-standing habits and unwarranted assumptions tend to threaten team efficiency and performance(Katzenbach, 1993). In group level, learning is enabled through testing assumptions and discussion of opinion differences transparently in order to improve team performance(Edmondson, 1999).

Indeed, learning behaviour of teams refers to activities that team members carry out and through which team is able to obtain and reflect data and outcomes of actions which further shapes and improves team behaviour. Such activities consist of reflection and improvement-aiming factors including asking for feedback, transparent information sharing, asking for help, admitting and discussing about failures and errors as well as experimenting. Through such activities teams may observe changes in environment, customer requirements and improve collective understanding. In addition, team's ability to discover and react to unexpected situations and consequences of their actions is likely to improve through learning behaviour. Consequently, compared to low-learning teams that tend to get stuck and are unable to solve problems, teams who master in learning are greater in confronting difficult situation and improve their work. (Edmondson, 1999)

Edmondson (1999) has studied factors that affect and influence learning behaviour in teams by studying in which conditions and to what extent learning occurs naturally. Based on her research, Edmondson (1999) created a concept of psychological safety, which refers to team's confidence, shared belief and mutual trust among team members towards that speaking up in a team does not lead to embarrassment, rejection or punishment of any kind (Edmondson, 1999). This concept has roots already in early research on organisational change. Schein and Bennis (1965) state that in order individuals to change and feel safe they need psychologically secure environment.

However, team psychological safety should not be confused with groupthink effect that refers more to group cohesiveness, which seems to be related to decreased willingness to disagree and challenge team member's views and thus reduces interpersonal risk-taking (Janis, 1982).

2.4 Learning organisations and its building blocks

"Learning organisation is an organisation, where people are able to constantly develop and achieve intended results; where new ways of thinking are born and where people share goals and learn together." (Senge, 1990)

The description above for learning organisation from Senge (1990) is one of the most famous. According to Garvin et al. (2008) in learning organisation employees excel at creating, acquiring and transferring knowledge. In order to improve long-term learning of an organisation, strengths and weaknesses of an organisation and its unit needs to be recognised. They also define three building blocks to support learning organisation, which are supporting learning environment, concrete learning processes and practices and leadership behaviour that reinforces learning. These building blocks can be considered and measured as independent components yet each of them vital to the whole, as learning is a multidimensional phenomenon. (Garvin et al., 2008)

Edmondson (1999) presents and studies behaviours through which various outcomes of learning as adaptation to change, understanding or improved performance are likely to be achieved. Supporting learning environment refers much the same concept as psychological safety of Edmondson (1999) described in section 2.3. According to Edmondson (1999) team psychological safety should be the first essential building block of learning behaviour in work teams. Supporting learning environment consists of four characteristics: psychological safety, appreciation of differences, openness to new ideas and time for reflection (Garvin et al., 2008).

Concrete learning processes and practices includes experimentation, information collection, analysis, education, training and information transfer. Learning organisations can be supported through concrete steps and activities which are tested and further developed through experimentations. Furthermore, information and intelligence about customers as well as technological trends should be collected systematically and further analysed focusing on identifying problems and solving them. Training and education of new

and established employees is an essential part of practices and processes. Finally, through transparent and meaningful knowledge sharing organisational learning can be enhanced, focus being on clear, well-defined and working communication systems that employees can easily relate to. Concrete processes together with efficient knowledge sharing methods ensure essential information being available fast and efficiently for employees to use. (Garvin et al., 2008)

Leadership behaviour should reinforce learning. This requires new way of leadership (Shalley and Gilson, 2004): instead of leading the work, role of the leaders is turning to more coaching-oriented (Hammer and Champy, 1993). Behaviour of leaders is highly related to the performance of employees (Kim and Mauborgne, 2014) and organisational learning (Garvin et al., 2008). In order to encourage learning of employees, leaders should prompt dialogue and debate, ask questions and listen to employees (Kim and Mauborgne, 2014; Garvin et al., 2008). Yet, supportive leadership behaviour alone is not sufficient guarantee for organisational learning. Garvin et al. (2008)emphasise how organisations are not monolithic and managers should sense differences in culture, department and units. In addition to cultural differences, learning requires clear and targeted processes and practices.

Leadership behaviour helps in creating supporting learning environment, which supports managers and employees in creating and defining concrete learning processes and practices. Furthermore, concrete processes support leaders' behaviour in a way that fosters learning and through own example cultivates that behaviour to others. (Garvin et al., 2008)

2.5 Creative individual

Divergent thinking refers to an individual's ability to find multiple alternative solutions and ideas to problems, and has been related to serve as a key capacity affecting creative thinking (Guilford, 1967). Amabile et al. (1996) defines creative thinking as a way how people approach problems and come up with solutions. Thus, creative thinking refers to a combination of past experiences creating expertise and the ability to apply creative thinking skills to these experiences and invent new solutions. (Amabile, 1998)

Recently problem construction processes have been recognised and combined to everyday problem-solving and real-world creativity (Getzels and Csikszentmihalyi, 1975; Runco and Okuda, 1988). According to study of (Gardner, 1988) correlation between creative problem solving and everyday problem solving exists: they seem to have the same roots in information processing skills. Indeed, problem finding and construction, making connections

and evaluating ideas are important for creativity (Mumford et al., 2002; Vincent et al., 2002). Thus, when improving individual's possibilities to multiple alternatives, related ideas and example solutions, they tend to make more connections leading to creative actions (Amabile et al., 1996).

Accordingly Mumford and Gustafson (1988) emphasise that creative people consistently and with confident tend to seek for alternative solutions, even under uncertain conditions. Even though expertise and intelligence have been related to problem solving, series of causal analyses carried out by Vincent et al. (2002) revealed unique effects divergent thinking had that were not attributed to intelligence and expertise.

Several factors form the basis of creativity skills of an individual, essential being personality and personal characteristics (Mumford and Gustafson, 1988; Jung et al., 2003; Redmond et al., 1993). Studies show employees who consider and believe creativity as valued outcome and believe in their own creative abilities are more willing to generate ideas, experiment, communicate openly with others about ideas and through this, overall, their behaviour will eventually lead to creative outcomes (Shalley and Gilson, 2004). Accordingly, Csikszentmihalyi (1999) presents the belief and feeling an employee has on the capabilities, pressure, resources and socio-technical system of work environment affects highly on the success of creativity.

Intrinsic motivation is claimed to be one of the most powerful tools to creative action and non-traditional thinking (Amabile et al., 1996; Deci and Ryan, 1996; Jung, 2001), as intrinsically motivated individuals usually prefer novel solutions, challenging status quo and trying out new ways for problem-solving (Amabile et al., 2002). Broad interest stands as a sign of intrinsic motivation, which is also widely related to both creativity and well-being of an individual and innovation (e.g. (Hennessey and Amabile, 1988; Csikszentmihalyi, 1999; Gardner, 1988; Shalley and Gilson, 2004)). In their study Tierney et al. (1999), found positive correlation between employee's level of enjoyment while working on a creative task at hand and the level of creativity. The study of Redmond et al. (1993) showed how through motivational mechanisms, such as self-set goals, involvement and commitment, problem construction may have positive influence on solution quality and originality. Thus, problem construction is likely to have its greatest impacts on performance when in the process employee is allowed to express his values, needs and interests(Redmond et al., 1993). Accordingly, Shalley and Gilson (2004) relate this to autonomy and independence in decision-making of an individual

Meaning of prior knowledge and experience of an employee of area of work before demanding or anticipating creative actions from them is related to creativity (Mumford and Gustafson, 1988; Redmond et al., 1993; Shalley and Gilson, 2004). According to Mumford and Gustafson (1988) and Redmond

et al. (1993) without previous experience of the job routine and substance knowledge and expertise on the field creative endeavours are more rare. Also Jung et al. (2003) argues for technical knowledge of an individual for fostering creativity. However, even though has been argued how routine work and task familiarity is likely to lead to habitual performance (Ford, 1996), knowing the status quo may provide opportunities for creative actions and solutions through reflecting and practising skills required in the field. (Shalley and Gilson, 2004; Andriopoulos and Lowe, 2000) Although job rotation and employees from different areas works as a great source for new perspectives and development, creativity requires sufficient level of familiarity of target area (Shalley and Gilson, 2004).

Shalley and Gilson (2004) argue that through developing extensive set of skills, employees may learn to be more comfortable and confident in thinking from different perspectives, finding various alternative solutions, trying out novel things and seizing opportunities. Individual creativity requires ability to work in a team, communicate, learn and reflect own learning (Roffe, 1999) to receive feedback (Jung et al., 2003), ability to generate alternatives, engage in divergent thinking and tolerate or suspend judgement (Hennessey and Amabile, 1988) .Through this perspective creativity can be considered as a skill that can be learned and strengthened.

2.6 Supporting creativity in organisations

Oldham and Cummings (1996) consider creativity skills and characteristics of and individual important, yet they add the importance of characteristics of organisational context such as job complexity, supporting supervision or controlling supervision. According to Roffe (1999) creativity and innovation in an organisation require integrated organisational approach, right climate, appropriate incentives for innovators, and a systematic way and resources to transform an idea into an innovation. In addition,Jung et al. (2003) refers to strategy, structure, culture and available resources being essential in organisational level whereas in group level creativity skills consist of task structure, communication styles and task autonomy.

Amabile (1998) has identified three factors being important for stimulating creative behaviour in individuals and organisations: individuals' intellectual capacity (creative thinking skills), expertise based on past experience and supporting work environment for creativity. In addition, needs to be noted and understood that employees' thinking styles are shaped through what is rewarded, meaning that if organisational environment rewards well-behaving and instruction-following thinking style and action, employees tend

to implement their style to that. We are urged to adapt to organisational style and fit in, and when this is not possible, people tend to leave. (Sternberg et al., 1997)

Creativity is not restricted to artistic occupations only; it is required in various professions in which work tasks involve complex, ill-designed problems where novel solutions are needed and status quo challenged (Mumford and Gustafson, 1988). Indeed, idea implementation may require even more creativity than idea generation (Mumford et al., 2002). In addition, depending on the job, different level and amount of creativity is required. Certain jobs that are highly involved with novel solutions urges for creativity as major breakthrough and innovative ideas, whereas more routine and repetitive jobs such as assembly line work requires creativity in developing the job practicalities. (Shalley and Gilson, 2004)

Even though not all jobs require same amount of creativity, all organisations benefit from understanding where creativity is required and how it can be fostered and managed (Shalley and Gilson, 2004). Likewise, creative actions of an employee are not worthwhile for an organisation when not coordinated or harnessed to yield organisational-level outcomes (Jung et al., 2003). Thus, the future focus should be in organisations' ability to mobilise creative actions of employees to create novel, socially valued products or services and more efficient ways of working (Mumford and Gustafson, 1988).

Creative work is resource intensive where risk is involved (Mumford et al., 2002). It is demanding and time-consuming (Mumford et al., 2002) and requires attention over long periods of time involving high level of ambiguity and stress (Kasof, 1997). Thus, organisational environment plays a major role in supporting employees' creative skills, and such stifling factors include for instance positive challenge at work, encouragement from organisational level, support from work group as well as supervisory encouragement. Furthermore, organisational impediments can lead to decreased level of creativity. (Amabile, 1998)

Generation of novel, alternative solutions requires problem-finding skills (Runco and Okuda, 1988), which has been indicated to be one of the best predictors of creativity in 'real world' activities, when studied 91 elementary school students (Runco and Vega, 1990). These findings suggest leaders, in order to enhance creativity of employees, to support learning of these skills for instance by facilitating problem-construction (Redmond et al., 1993). In their study Redmond et al. (1993) found leaders who supported employees problem-finding and problem construction skills and encouraged in generating multiple alternatives lead to more unique and novel solutions.

According to Isaksen (1983) in order to support employee's creativity, leaders should focus on creating and maintaining an environment of support-

ive empathy, respect, warmth, concreteness, genuineness, trust and flexibility. These factors have been combined to general and task-specific efficacy needs (Mumford and Gustafson, 1988). Furthermore, through providing enough processing time for creating novel solutions is likely to enhance creative behaviour of employees (Isaksen, 1983). As creativity refers to finding novel solutions and generating understanding of problems at hand, leaders could facilitate the process of resource allocation, feedback and task management (Mumford and Gustafson, 1988). In order to achieve novel solutions and fresh ideas, leaders may seek employees who have great knowledge and expertise or provide employees education and possibilities to develop their problem construction skills and furthermore encourage approaching problems from various perspectives. (Redmond et al., 1993) Overall, instead of managing creativity leaders should manage for creativity (Amabile and Khaire, 2008).

Furthermore, pre-set obstacle, such as a deadline, assists in focusing individual's attention to an urgent problem, and has been noticed to stimulate creativity (Andriopoulos and Lowe, 2000). As employee who has the feeling of autonomy performs better, setting a deadline is not likely to threaten that autonomy, whereas showing someone how to meet that deadline would do (Mumford et al., 2002). In addition, supporting employee's feeling of self-efficacy is likely to improve creative skills of an employee (Redmond et al., 1993), and can be done through giving positive and realistic feedback, allowing adequate resources and physical support, clarifying task assignments, providing development support for employees, and assigning employees to appropriate tasks (Hennessey and Amabile, 1988).

Where leaders have a great role in enabling creative behaviour in teams and individuals, team members also influence essentially in others. Thus, by utilising various human resource practices leaders should create an environment where creativity is encouraged and supported. (Shalley and Gilson, 2004) Study of Ancona and Caldwell (1992) argue how changing the structure of teams may not be sufficient and does not lead to improved performance. Rather the leader and the team should find ways to foster positive effects of the team processes and reduce the negative ones. At team level this may mean focus on enhancing negotiation, problem-solving and conflict resolution skills while at organisational level leader should protect the team from external political pressures and reward the team from performance outcome instead of functional ones. (Ancona and Caldwell, 1992)

2.7 Summary

In this chapter learning was approached from organisational and individual perspective, supported by team perspective and performance in an organisation. Learning was defined as experiential-based iterative, life-long process of an individual and definition of learning organisation consisting of people developing and achieving intended results, aiming for novel ways of thinking, thriving for shared goals and learning together (Senge, 1990). Conditions enabling learning organisation were defined to be supporting learning environment, concrete learning processes and practices and leadership behaviour that reinforces learning.

In addition, need for creativity in organisational and individual level was described and ways to support creativity and creative actions in organisations were introduced.

Attributes provided in this chapter are essential to understand when considering novel approaches for development and new-value creation. Next chapter will present an experimentation-driven approach to developing as an alternative for conventional, planning-based developing.

3 Experimentation-driven development

"What I hear I forget. What I see I remember. What I do I understand."
Lao Tse, Chinese philosopher

In the introduction part change in organisational and business environment were presented, forming background for the need of new methods to deal with change. This chapter presents experimentation-driven approach as such a method for developing and learning.

Even though innovation and innovation processes were not in the focus of the study, experimentation serves as a method to foster innovation and is mostly brought up to the academia through innovation literature. Thus, it is an essential approach to contemplate together with the topic of experimentation. In the first section of this chapter, innovation process is briefly presented.

This chapter outlines the relation between experimenting and innovation, describes the experimentation-driven process for development, serves examples on experimentation in action and outlines how experimenting can be considered as a method for learning.

3.1 Innovation process

According to Buijs (2007), innovation consists of coming up with novel ideas and implementing them. Also Vincent et al. (2002) argues whereas creative processes comprise of initial idea generation, innovation process goes beyond the activities underlying the implementation of those ideas.

Innovation process is a series of stages for processing the idea, and in the end of every stage the idea is reflected and evaluated before further processing. Evaluation points stands for usable tool for measuring the quality of idea but gives also understanding of how the evaluation process is going. In addition, while evaluating, team members also need to reflect the process and the idea, through which learning occurs. (Buijs, 2007) Several other studies confirm how only after evaluation of ideas implementation should be discussed and performed (Mumford et al., 2002; Vincent et al., 2002; Runco,

1994). Useful questions in evaluation process could be "What went well?", "What can be improved?" and "What has been learned?" (Buijs, 2007).

According to Buijs (2007) innovation process itself can be approached from several angles: first of all, content of the innovation has to be clear - whether the purpose is to innovate new products, manufacturing processes, ways of organising work or ways of dealing with people. Secondly, psychological process of the innovation team has to be understood, essential being shared understanding, level of comfort with ambiguity and degree of trust between team members. Thirdly, creative process of the team, referring to idea generation processes, needs to be understood and efficiently facilitated. (ibid) Amabile et al. (1996) list similar attributes to contribute innovation: idea generation, creating climate of autonomy, engaging employees in their work and rewarding with both intrinsic and extrinsic rewards.

3.2 Experimentation in innovation processes

When dealing in unpredictable, complex and uncertain environments, traditional ways for developing and innovation are not efficient, tend to take lot of resources and are too specification-driven, where specifications of the product or serviced are locked in the beginning of the project. In recent years the centre of innovation discussion in management and business literature have shed light on the concept of early, rough and iterative experimentation process models on innovation (Thomke, 1998; Tuulenmäki and Välikangas, 2011).

Thomke (1998) defines experimentation as an essential part of innovation activity, relating it to the innovation process as a whole that has effects on the cost and time of the process. Mumford (2002) argues in his study of Ben Franklin's social innovations, that the key factor in successful social innovation lays in fast demonstrating, which he also refers as experimenting. Even though literature on innovation focuses on organisational-level structures and processes, the innovation process and organisation's ability to launch a new product or service, create new value and processes as well as leverage novel technologies begins with individual employees presenting their ideas out loud and trying out novel approaches. (Argote and Ingram, 2000) Thus, forming understanding of conditions that foster experimentation behaviour of individuals is important in order to support organisational innovation (Thomke, 2003).

In this thesis experimentation refers to a personal trial and error process in which employees utilise their full potential (Andriopoulos and Lowe, 2000). Experimenting serves as a method for testing and validating abstract

concepts (Kolb et al., 1984) and dealing with novel products, ideas and processes. Innovation literature describes experimenting essential for new value-creation. Through experimenting essential factors concerning the final product are revealed before resources are overly spent, and through small failures success can be reached both earlier and faster. (Thomke, 2003)

Experimenting as a means to develop and foster innovation is not a new approach. Discoveries such as artificial vaccines, flying and electric light bulb were results from iterative, trial-and-error process where knowledge was created trough iterations. (Thomke, 2003) For instance, development process that lead to the innovation of a light-bulb consisted of repeated iteration of experiments, analysing the outcomes, learning from them and making changes for the next experiment. (Thomke, 2001) In addition, the significance and benefits of early experimenting or prototyping have been long recognised in working fields featuring complexity and unclarity, such as industrial and interaction design (Blomkvist, 2011).

According to Thomke (2001), in the beginning of every product is an idea, that was being shaped through the process of experimentation, and the ability to conduct experiments is actually a measurement of company's ability to innovate.

According to Quinn (1985), fast multiple-idea prototyping leads to more innovative outcomes, offers essential information about ideas or product's quality, motivates employees, and helps the company and the team to cope with anxiety and uncertainty in development. Thus, fast prototyping serves an essential way for learning from the iterative process. Market analysis, however, remain valuable when dealing with familiar products, yet with radical innovations they may easily offer misleading information. (Quinn, 1985)

Bank of America has conducted experiments several years in order to create novel service concepts for retail banking. They have set up an experimentation laboratory in some of their banks where customers during normal office hours can test novel ideas. Feedback is collected and experiments measured in order to learn for further experiments. During this process Bank of America has learnt radically about the system approach and deepened their understanding of the dynamics of service innovation. They have gained valuable insights and competitive advantage. (Thomke, 2003)

Experimentation-driven approach for innovation differs from other methods for managing uncertain and innovation-focused projects in that it emphasises learning more than other methods. Overall, experimentation serves as a tool and everyday practice to guide company's strategy-making, business models and behaviour (Davenport, 2009; McGrath, 2010).

3.3 Process for experimentation

In the heart of problem-solving process is continuous trial and error which are directed by some amount of insight about the possible direction of the solution (Baron, 2000). Experimentation refers this iterative trial-and-error process where every trial provides new information of a problem (Thomke et al., 1998). Through each trial new information is generated that would be challenging or even impossible to know in advance. Subsequent experiments are modified based on the information learned from previous trials, and in many cases this affects the way experiments are designed, conditions they are conducted in or even changes the direction of the desired solution. (Thomke et al., 1998) Thus, supporting tasks for experimentation are those allowing multiple problem-solving trials as well as present opportunities to be used together with earlier knowledge enhancing overall learning. (Lee et al., 2004)

Experimentation process is presented as an iterative four-step learning cycle presented in figure 3.1 consisting of setting a hypothesis, planning an experiment, executing it and analysing the results. In the first phase, experimentation is designed based on the previous experience or good guess on solution, so hypothesis is set. In second phase the experiment is planned and the needed prototypes or spaces are build for experiment, following third phase where experimentation is executed. Analysing phase is essential in order to learn from the results and process and being able to conduct the cycle effectively again. (Thomke, 1998) Through experimentation the fundamental assumptions behind an idea can be tested (Tuulenmäki and Välikangas, 2011).

Thomke (2003) defines several aspects to measure an experiment. These consist of fidelity, cost, iteration time, capacity, sequence, signal-to-noise ratio and type. Fidelity refers to an experiment conducted under conditions that represents actual use of final product, process or service in close detail. However, when testing in actual environment, various variables may affect on the experimentation setting, and this signal-to-noise ratio should be taken into account. Right balance between the speed of experimenting and receiving feedback in order to learn is crucial for successful experimenting, and this iteration time should be measured and estimated: time from the planning an experiment to the moment when results are available and further used. Also, cost of experiments should be analysed by estimating cost of designing, building, running and analysing experiments. Capacity concerns the realistic estimation of number of experiments possible to conduct with decent amount of fidelity in planned period of time. Experiments can be conducted in series or in parallel depending on the project at hand, and thus the sequence of

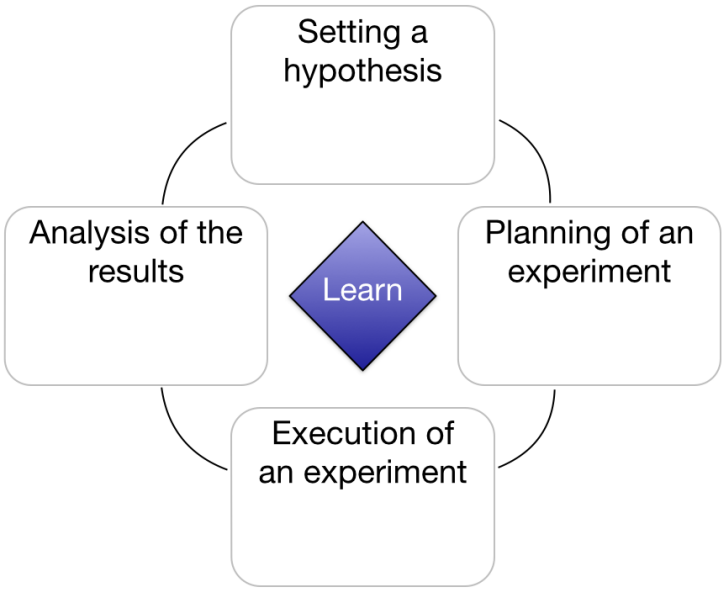

Figure 3.1: Iterative learning process for experimentation, adapted from Thomke (1998)

experiments can be measured. Experiment type refers to the level of change, which can vary from incremental to radical. (Thomke, 2003)

Experimentation-driven models

Conventional models for developing and innovating, such as stage-gate, consists mainly on planning the process and designing the solution without iterations. A pilot test is conducted in the very end of the process in order to finalise the project and solution. Commonly pilot tests consume significant amount of time and resources and end up in a notice that the product or service does not relate to customer needs. (Schrage, 1993). Receiving feedback in this late phase of the project may lead to remarkable total costs and concurrently opportunities for innovation are lost. Experimentation-driven approaches focus on iterative testing and feedback loop, whereas conventional models emphasise the right solution with the first try. (Thomke, 2003) Through experimentation new information and ideas can be generated and new opportunities can be found (Tuulenmäki and Välikangas, 2011; McGrath, 2010).

Prototype-driven approach refers to a method in which customer feedback

is acquired through prototyping in an early phase of the process in order to make changes in an affordable manner. Prototyping was noticed to be successful and lead to more successful products, produced with fewer design resources. Also higher customer satisfaction, quality and company's performance have been related to more flexible development process, in which changes can be made in the very late phase of the development process. (Thomke and Reinertsen, 1998)

Experimentation is often conducted by using as simple prototypes of the intended-product as possible in order to experimentation remain light and cost-efficient. According to Thomke (2001), critical part of innovation process occurs when first prototypes are generated, as at that point they can be further tested with customers, discussed and evaluated. However, experimenting only rarely leads to successful solution. Thus, planning and conducting multiple experiments in order to get closer to the problem solution is necessary. (Thomke et al., 1998)

McGrath (2010) offers an alternative model for experimentation-driven innovation, Discovery-driven Growth Process. In this model, instead of traditional yearly development of business, organisation sets an annual target and aims at experimenting it with as few resources as possible to learn from the target and clarify it the next year. In turn, the Lean Startup approach considers startup companies as a means of assuring and testing the strategy of an organisation to reveal which parts of it work and which do not work. (Ries, 2011)

According to Execution Innovation Model of Tuulenmäki and Välikangas (2011), experimentation-driven innovation process consists of series of iteration with the three idea types: opportunity idea, experimentation idea and execution idea. According to this model, new business can only be generated through a learning process of iterative experimentation, and specifications of the final business or product and final execution idea are decided only after several iterations that aim to validate and explore the implementation possibilities. (Tuulenmäki and Välikangas, 2011)

In this thesis, Execution Innovation Model is discussed in more detail. Figure 3.2 summarises differences between the execution innovation model and other development modes.

An example to go through the phases of experimentation-driven innovation process is the story of Zappos, an online shoe retailer company, which at the moment is one of the most successful online shoe stores in the world. The owner of the company, Tony Hsieh, got *an opportunity idea* to sell shoes online, without the need to go the store, all tired and frustrated. However, back in 2004 an idea of an online retailer for shoes was quite absurd, but Hsieh generated *an experimentation idea* to test the hypothesis of people

being interested in buying shoes online: he visited a local shoe store, asked permission to take pictures of a pair of shoes, downloaded the picture online and waited if potential customers found them and made a purchase. When this occurred, he returned to the store, bought the pair and shipped them to the first customer. Instead of writing a business plan a founder produced an experimentation idea: the easiest way possible to test whether the opportunity idea is worth further development. (Hsieh, 2010) Through this experiment Hsieh learnt his idea was not all worthless and also gained major insights considering the whole process, and *the execution idea*: purchasing, shipping, customer service, invoicing and customer wishes. From this small experiment Zappos has grown to one of the biggest online shoe retailer companies in the world (Hsieh, 2010).

Opportunity idea refers to an idea which is imagined to solve specific problem and something that brings closer to the solution. Experimentation idea assists in testing the critical assumption and figuring out, whether the idea is worth taking further risks. Execution ideas are the outcomes from experimentation ideas, those ideas that have been through iterating and validating process chosen to further development and implementation. Execution ideas gather all the learnings from experiments, through which the original opportunity idea is modified in order to reach the final design plan. (Tuulenmäki and Välikangas, 2011)

3.4 Experimentation as a method for developing and learning

According to Edmondson (1999) and Henderson and Clark (1990) experimenting and reflecting the results are essential characteristics of learning. March (1991) refers to exploration (experimenting with new approaches and alternatives) as a method to tolerate and learn from uncertain and distant outcomes. Also Lee et al. (2004) argues experimenting being fundamental for learning especially when dealing with problems with uncertain outcomes. Likewise, experimenting works when the most essential sources of information do not exist or are unreachable (Lee et al., 2004).

In addition, Garvin et al. (2008) includes experimenting as an essential part for a learning organisation, experimenting serving as a tool for a concrete learning process and practice. The amount and value of learning achieved from experiment defines its success: the more has been learnt and the more valuable insights, the more successful the experiment (Thomke, 2003).

According to Vincenti (1990) through experimenting new knowledge is

created and engineer's understanding of new analytical concepts and ways of thinking widens. Accordingly, employees who improvise, practice their thinking and conduct experiments remain in the fierce competition of industries requiring constantly fresh ideas and innovations (Ciborra, 1996).

The essence of learning from experiments is to figure out what works and what does not in an experiment or idea. Thus, experiments should be designed and planned keeping in mind how to maximise the amount of learning and valuable insights, not focus on wrong details and success of the experiment itself. Through defining accurate measures one can actually know whether the experiment was useful and essential was learned (Thomke, 2003).

Thomke (1998) defines experimentation efficiency, referring to "economic value of information learned during an experimental cycle, divided by the cost of conducting the cycle." The more inexpensive (costly) an experimentation is and the more valuable (valueless) gained information is, the higher (lower) is experimentation efficiency.

Furthermore, experimentation is essential in order to learn about the idea, concept and prototype and whether it actually addresses a new need or a problem, or solves the one at hand (Thomke, 2001). Prototyping is critical part of the process, as testing the prototype in a real environment gives instant and valuable feedback for further development (Thomke, 2001).

Anticipating and exploiting early information can save a lot of resources in the development process. According to IDEO, an innovation and design-firm, using human-centred design-based approach, the key elements in the design process and prototyping is it being rough, rapid and right. The right-element reminds that even though the prototype itself is likely to be incomplete, it has to show the right specific aspects of a product. This forces developers to decide the factors that can initially be rough and those that must be right. In addition, exploiting early information serves as a good method for developers reflecting changing customer preferences. Briefly, information in the early stage of the developing process should be listened and discovered carefully, as the problems are cheaper and easier to solve. (Thomke, 2001)

3.5 Summary

The aim of this chapter was to present experimentation-driven approach for developing. Through trial and error process various design alternatives can be tested and generated, essential being reflection after each experiment and making changes accordingly to next experimentation round. (Thomke et al., 1998)

Experimenting stands as a method for learning: according to Edmondson (1999) and Henderson and Clark (1990) experimenting and reflecting the results are essential characteristics of learning, and March (1991) refers to exploration (experimenting with new approaches and alternatives) as a method to tolerate and learn from uncertain and distant outcomes. In addition, Garvin et al. (2008) includes experimenting as essential part for learning organisation, experimenting serving as tool for concrete learning process and practice.

Next chapter further describes factors essential for experimenting in organisational context.

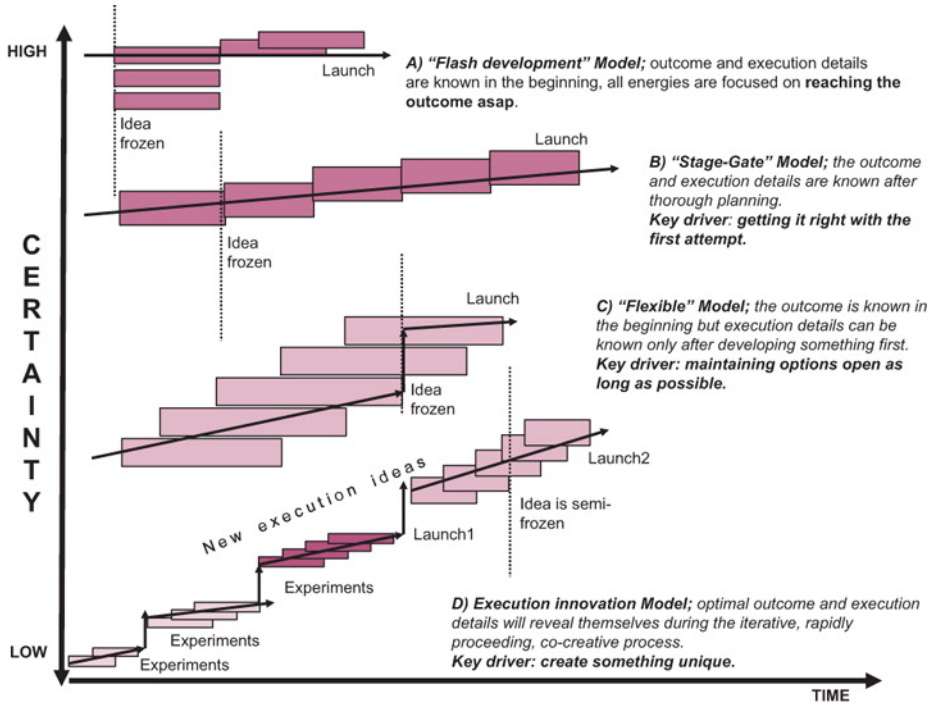

Figure 3.2: Differences between the execution innovation model and other development modes (Tuulenmäki and Välikangas, 2011)

4 Factors affecting experimentation

This chapter provides consensus of factors that affect experimentation behaviour. Experimentation as a method for learning and developing has not yet been widely studied, yet creativity and learning skills of an individual have been related to willingness and ability to conduct experiments. Thus, in this chapter, theories from research fields such as organisational behaviour, leadership and management, creativity, innovation and prototyping are combined.

In the first section supporting environment for experimenting is presented, outlining how psychological safety, tolerating risk and learning from failure are all essential for experimentation behaviour. Then, the second section outlines team perspective towards development, including low hierarchy, clear and fair communication and team engagement. Current trend in research shows leaders and their behaviour have great influence on the creativity and innovation ability of employees (Mumford et al., 2002; Jung, 2001; Amabile, 1998). Thus, the last section presents how leadership behaviour affects on employees' willingness and abilities to conduct experiments.

Only through understanding factors affecting experimentation behaviour can experimenting be supported in organisations.

4.1 Supporting environment for experimenting

Mumford and Gustafson (1988) have studied the gap between an idea an action, and revealed it depending on various attributes related to individual and organisational circumstances. Experimenting requires creative actions and willingness to solve problems, thinking out of the box and challenge status quo. When employees feel they are working in supporting working environment, level of creativity and ability find novel approaches and try out new things increases. (Shalley and Gilson, 2004) In addition, study of Oldham and Cummings (1996) show how creative individuals may only produce more creative outputs than less creative individuals when the context is supporting and encouraging towards creativity. Thus, environment should be designed

to support and facilitate these skills. These environmental variables include for instance providing resources to stimulate fresh ideas and clear and sufficient interaction between team members and management (Mumford and Gustafson, 1988; Shalley and Gilson, 2004).

As physical work environment affects on creativity, information sharing and innovation in an organisation, it should be designed to support the natural flow of traffic through the building so that informal conversations between different functional areas are enabled (Shalley and Gilson, 2004). According to Edmondson (1996) supportive organisational context consists of access to sufficient amount of resources, information, training, rewards and management coaching. Proactive learning behaviour is related to all above mentioned (Edmondson, 2003).

Furthermore, organisational climate has to support and encourage innovation (Mumford and Gustafson, 1988; Amabile, 1998) by valuing initiative and innovative approaches that support employees in risk-taking, accepting challenging assignments and stimulate intrinsic motivation towards work (Jung et al., 2003).

Experimenting requires safe and supportive environment, in which an individual feels psychologically safe, where uncertainty is tolerated and failures accepted as a part of the development process. In this section these aspects are described in more detail.

4.1.1 Psychological safety

Organisations exist in which people do ask help, admit errors, discuss about problems and are willing to conduct experiments. In these environments employees seem to perceive interpersonal threat low enough to perform in spite of the threat. Some studies argue familiarity among group members is likely to encourage openness towards new information and ideas (Sanna and Shotland, 1990), yet this alone is not sufficient to explain when group members find it safe to act instead of feeling threatened (Edmondson, 1999). Edmondson (1999) has studied working environments and realised in environments employees act despite the threat, they feel safe and supported for their actions. She refers to this as psychological safety, which serves as a mechanism that assists in explaining how structural and interpersonal characteristics both have effects on learning and performance in teams (ibid).

Trust has been widely noted in research as an essential factor in organisational teams and groups to act(Golembiewski and McConkie, 1975; Kramer, 1999; Shalley and Gilson, 2004; Edmondson, 1999). Trust refers to one's willingness to be vulnerable in his actions as he expects his actions will not be judged and will be favourable to one's interests (Robinson et al., 1997).

Interpersonal trust is involved in psychological safety, yet it also includes perception of mutual respect and overall climate where team members feel free to be themselves (Edmondson, 1999).

Psychological safety of employees can be increased for instance through great teams and teamwork (Edmondson, 1999). Team psychological safety consists of team members' shared belief towards interpersonal risk-taking, coming up with new ideas and breaking the status-quo. Employee's willingness to take interpersonal risks depends highly on the experience of team safety and person's beliefs how others will respond in ideas or situations involving uncertainty. (Edmondson, 1999; Farson and Keyes, 2002) When knowing that well-intentioned interpersonal risks are not punished is a shared belief of a team, team members are more likely to take proactive actions essential for experimenting (Garvin et al., 2008).

Accordingly, Amabile (1998) suggested when employees are encouraged to tell their ideas out loud freely and without judging, idea exchange and discussion about them increase. In addition, the sense of clarity and safety of employees at workplace is increased through clearly elaborated expectations, evaluation methods and rewards. Furthermore, sense of being treated fairly is essential for willingness to conduct experiments. (Shalley and Gilson, 2004)

Furthermore, psychological safety can be fostered through structural factors such as context support and team leader coaching (Hackman, 1987; Edmondson, 1999). Context support refers for instance to access to information and resources needed. Safe environment that fosters creativity also takes into account employees' perceptions of just and transparent decision-making as well as applied actions (Shalley and Gilson, 2004). Climate of safety and supportiveness encourages employees to seek for feedback and ask for help in addition to admit and reflect mistakes. (Edmondson, 1999)

According to Lee et al. (2004) in order to foster innovation, organisational conditions should be regarded from a broad, holistic perspective. Inconsistency among organisational conditions stands as a threat for employee's behaviour. For instance, willingness to conduct experiments reduces when some part of the organisation or managers encourage experimentation and others do not. (ibid)

In psychologically safe environment uncertainty is not totally avoided but managed and tolerated (Shalley and Gilson, 2004). What follows is detailed description of how essential tolerating risk and uncertainty is.

4.1.2 Tolerating risk and uncertainty

"We love innovation and we urge for innovation, but we can tolerate it only if it is controllable and results everything remaining the same". (Quinn, 1985)

When dealing with novel solutions and challenging status quo, we are dealing with innovations that include risk-taking. Concurrently conventional management processes avoid risk-taking and focus on managing daily routine business. (Quinn, 1985) However, in his study Nyström (1990) found that organisational culture reflecting challenge and risk taking lead to more innovative actions of employees and the whole organisation. Creative actions require several trial-and-error, iterative, experimentation processes (Shalley and Gilson, 2004). However, when fearing risk-taking and uncertainty, individuals stick to routines and prefer more certain outcomes and ways of performing (Bazerman and Moore, 2012; Shalley and Gilson, 2004).

The phenomenon of threat and embarrassment of employees in organisations is widely studied and consensus is rising how threat effects on cognitive and behavioural flexibility and responsibility in reducing manner. (Argyris, 1982; Edmondson, 1999; Staw and Nemeth, 1989) An employee is likely to inhibit trying novel approaches as a result of fear of being rejected, under pressure or placing himself at risk (Edmondson, 1999). This is likely even though their transparency and honesty would be highly important for the behaviour of the team (Argyris, 1982; Edmondson, 1999). This may occur in a situation where an employee should ask for help, yet is afraid of appearing incompetent or giving unfavourable impressions on people who have the power to give promotions, raises or who assigns projects. (Edmondson, 1999; Brown, 1990).

Also according to Brown (1990) admitting mistakes, asking for help and seeking feedback are all relevant abilities for experimenting, yet threatening for an individual's image of himself and his skills. Ambiguity is often perceived by individuals when lacking sufficient cues to structure a situation, and usually arises from novelty, complexity or unsolvability of a situation at hand (Budner, 1962). However, these are all characteristics related to experimentation (Tuulenmäki and Välikangas, 2011).

As predicting the future is impossible, uncertainty should not be considered only as a threat or inconvenience occurring in organisations. Rather should appropriate level of messiness let exist, not overly controlled, and develop opportunities where uncertainty can be exploited. (Sternberg et al., 1997) Level of uncertainty can be reduced for instance through goal-setting and fast prototyping (Mumford et al., 2002). Kanter (1983) emphasises opportunities actually grow from uncertainty and creative endeavours rise when struggling with uncertainty and messiness, as individuals impose order where it does not exist, and are thus forced to form new connections.

According to Andriopoulos and Lowe (2000) facing and dealing with risk serves also as positive boost to creativity, as employees learn new skills,

strengthen their capabilities constantly and adapt to new knowledge to already known. Also Mumford and Gustafson (1988) argue feeling of self-efficacy may affect individual's willingness to provide unique and novel ideas even when some degree of risk is involved. This, however, requires safe environment which Andriopoulos and Lowe (2000) refer to a safety net: environment that tolerates failure. Bank of America, an example described in section 3.2, got to notice how staff turnover in experimentation laboratories dropped considerably during the experimenting period. Even though employees faced difficulties and had to tolerate risks and uncertainties, they felt engaged and enthusiastic during the test period. (Thomke, 2003)

Furthermore, inconsistent organisational conditions tend to prevent experimentation behaviour. In their study Lee et al. (2004) found that in uncertain and unpredictable situations, employees under high evaluative pressure were likely to become uncertain, rigid and narrowly focused, leading decrease in psychological safety. In turn, employees under less evaluative pressure turned out more tolerant for taking risks, thinking optimistically, working more proactively and willing to conduct experiments. (ibid) Thus, human resource practices should be in line and systematically linked together in order to create a clear picture for employees of what is expected of them (Shalley and Gilson, 2004).

In creative work risk concerns both the need to do experiments and tolerate failure (Andriopoulos and Lowe, 2000; Quinn, 1985), as failing is widely considered as essential part of learning (Farson and Keyes, 2002). Thus, employees should be allowed to conduct experiments despite the outcome (Jung et al., 2003). Next section outlines how the attitude towards failures should shift to positive.

4.1.3 Failures as opportunities for growth

Applying experimentation-driven approach requires rethinking the role of failure in organisations. According to various studies, failing and negative consequences are natural part of creative, innovation and learning processes (Hennessey and Amabile, 1988; Shalley and Gilson, 2004; Andriopoulos and Lowe, 2000). Indeed, the learnings companies gain from large-scale pilots could be achieved with smaller tests that save resources (Anderson, 2011).

Also Lee et al. (2004) argue experimentation behaviour being essential for innovation and failures being inevitable for the process. For instance, Hennessey and Amabile (1988) emphasise negative consequences belong to a process, and in the concept of perpetual challenging of Andriopoulos and Lowe (2000), adventuring phase includes making mistakes. Likewise,Edmondson (1999) relates experimenting tightly to failing emphasise being on team learn-

ing.

Garvin et al. (2008) divide organisational failure into three categories: unsuccessful trials, system break-downs and process deviations. In this thesis, unsuccessful trials refer to failures in experimenting. Failure can disclose important information and reveal gaps in knowledge, and is thus important in as early phase of the development process as possible. (Buijs, 2007; Thomke, 2001) Also Sitkin (1992) emphasises how failures facilitate innovation and performance through new knowledge, which narrows the scope of following experiments. According to Thomke (2001), this is not a usual way for an organisation to think about failure, thus building the capacity for rapid experimentation as well as tolerating and learning from failure is essential and often requires overcoming ingrained attitudes. When growth of a company usually leads to more conservative actions and increase in fear of failure. When fearing failure managers tend to deny failure and erase it from the memory instead of learning from it. (Amabile and Khaire, 2008).

In turn, according to Farson and Keyes (2002) currently succeeding companies even thrive for failure in order to learn fast and find the best practices and business models. For instance, credit company Capital One conducts continually large amount of market experiments. They know most of the tests will not pay off, yet they also know how much can be learned about customers and markets from failed tests in early phase of development. (Farson and Keyes, 2002)

According to Thomke (2003) the most radical experiments provide the greatest learnings, yet they concurrently have the highest level of risk and thus high probability to fail. In laboratory settings allowing experiments to fail and still producing valuable insights is accepted. When brought to real life, employees tend to fear alienating customers or alienating top management who have the power to prevent further development. Conducting experiments in live settings may cause distraction for both customers and employees: customers may be confused by new processes and employees find it difficult to adapt to new routines. In addition, live experiments are in risk to hurt the brand and are oftentimes difficult and resource-consuming to execute and measure.(Thomke, 2003)

While these risks remain real, they have to be weighted carefully and the benefits and insights experiments and failures can provide considered. Experiments concerning service development remain most useful when conducted in real life circumstances, as the feedback is instant and customer transactions real. (ibid) Also according to Quinn (1985) engaging lead customers in the interactive development process instead of market research seems to elucidate more relevant information about customer's demands, required changes and entry strategies. In the example of Bank of America, in

only few years had they gained essential benefits that had real impact on business. (Thomke, 2003)

While failed experiments offer valuable opportunities for growth, issues about safety and health of people participating experiments need to be taken into account (Farson and Keyes, 2002). Furthermore, according to Thomke (2001), failures produce most value, when the experiment is well planned and the goal or hypothesis that needs to be tested is clear.

Failing as a personal matter remains a difficult subject, as failing never feels exceptionally great, and often employees still consider failed work as failing personally (Farson and Keyes, 2002). Especially in psychologically unsafe environments, interpersonal costs of failure may easily be exaggerated: employees are afraid how their need for help or gaps in knowledge become salient to colleagues or managers (Lee, 1997). Thus, conditions supporting psychological safety are likely to reduce fear of failure and encourage experimentation (Lee et al., 2004).

When failures are being punished through reward systems, the cost of experimentation increases and makes employees less willing to conduct experiments (Thomke, 2001).Lee et al. (2004) found that individuals are more likely to conduct experiments when being rewarded, and when rewards do not penalise for failures.

Studies show how nominal groups perform remarkably better in ideation and brainstorming processes by producing greater amount of ideas than real groups (Jung, 2001; Sosik et al., 1998). This may be due to the learnt practices and norms of a real work group, fear of failure that prevents free idea exchange and fear of evaluation and others judgement when suggesting creative solutions. Overall, oftentimes employees find it difficult to take a different role and actions in group with familiar members and routines. (Jung, 2001)

Thus, team's tolerance for imperfection and error should be increased (Edmondson, 1999). According to Thomke (2001) this can be done for instance through brainstorming sessions where judgement is not allowed. Also Garvin et al. (2008) states by creating an environment that serves psychological safety for employees, organisations may capitalise on failure. Safe environment does not humiliate or punish employees for failing or coming up with novel ideas or doubts. Garvin et al. (2008), De Dreu and West (2001), Amabile and Khaire (2008), and Amabile et al. (1996) Also according to Edmondson (1996) employees are less hesitant to discuss mistakes when normative values of the organisation and work group assure that failures are allowed and even expected part of developing and learning.

4.2 Team perspective and engagement

In order to create new value and competitive advantage in rapidly changing and uncertain organisational environments, new managerial imperative is growing, focusing on teams. Supporting teams in their work and understanding the aspects of learning is also required in experimenting (Edmondson, 1999). According to Monge et al. (1992) group communication is likely to increase innovation under some circumstances, and also Katzenbach (1993) argues for culture of strong team performance. According to Amabile et al. (1996) team can support and improve individuals' ability and willingness to aim for creative actions.

As presented in chapter 2.3, teams that are able to learn are better at solving problems, confronting challenging situations, observe changes in environment and customer requirements. In the theory of Edmondson (1999) on team learning, factors essential for learning are similar to essential factors for experimenting. These include transparent information sharing, asking for help, receiving and giving feedback, tolerating failures and discussing about them in order to reflect experiments and improve work. (Edmondson, 1999)

As individuals oftentimes require support and input from several individuals who help to challenge ideas in constructive ways, teams are essential in generating and implementing ideas (Mumford, 2002). Stimulating those constructive individuals for creative actions may be valuable (Robinson et al., 1997). In addition, including team members in ideation assists in idea implementation and through participation new ideas are not that likely to be rejected or abandoned (Agrell and Gustafson, 1994). Through brainstorming activities focus on non-traditional thinking and fantasising intellectual skills of employees can be enhanced (Sosik et al., 1998).

The composition of the team matters. Studies have shown how team performance, especially related to innovation, is improved when team consists of individuals with various and different set of skills and characteristics (Buijs, 2007). Homogeneity in teams easily leads to groupthink, routine work and repeating traditional daily practices, while even one or two different individuals can stimulate the innovativeness of a team. Actually, the outcasts and those who stand out from the group are required in order to think outside the box, challenge the status quo and present alternative solutions and ideas that would be missing without the participations of these individuals. (Sternberg et al., 1997) However, according to Quinn (1985) especially larger companies tend to hold tight on their conventional opinion how enthusiastic employees who challenge the status quo are likely to cause embarrassment and troubles for organisation.

Also Janis (1982) refers to social cohesion, which may inhibit innovativeness of the team and its individuals especially beyond a moderate level, while employees are more likely to settle on group think and traditional daily practices . However, according to the study of Sethi et al. (2001) a team sharing a superordinate identity, being encouraged to take risks, letting customer's requirements be heard, and actively letting senior management monitor the project, team is more likely to present innovative ideas and perform in innovative ways. According to this study, functional diversity does not effect on innovativeness, but team's superordinate identity can be strengthened by encouraging risk-taking and weakened by social cohesion. (ibid)

Communication of ideas among team has been widely recognised being related to idea generation, creativity and innovation(Robinson et al., 1997; Mumford, 2002; Monge et al., 1992; Amabile et al., 1996). According to Staw and Nemeth (1989) social influence of others plays a major role for individuals' beliefs; attitudes towards job, for instance, rise from the social labelling of work by others. Also Salancik and Pfeffer (1978) argue the essential role opinions of others may have on individual: individual's perception of her work and organisation can be greatly influenced by opinions of others.

Study of Sethi et al. (2001) showed how good interaction in a team and high level of commitment to the success of the team lead to more radical innovation abilities. In the study team members were highly encouraged to take risks, which lead to more motivated members in suggesting novel ideas from their perspectives. In addition, team members identified themselves strongly as part of the team, which again lead to higher commitment level. (Sethi et al., 2001)

In addition, in order to function team needs a clear purpose and vision what makes it a team and why it exists (Katzenbach, 1993) and according to Thomke (2001) the whole team understanding the meaning of experimenting and developing forms a basis for team engagement. Teams get energy from significant performance challenges regardless of where they are in the organisation. Set of shared, demanding performance goals usually form a team, and personal chemistry or willingness to form a team may boost that. (Katzenbach, 1993)

Thus, in order to receive great results teams should focus on performance regardless of the organisational hierarchy or what team does (Katzenbach, 1993). Team performance may exceed the results of what could be achieved if employees were acting alone as individuals without the team effort (Katzenbach, 1993). Thomke (2001) argues how small project teams together with parallel experimenting serves efficient especially when time is the most critical factor.

4.3 Experimentation design and practicalities

"Since it takes a chain of yeses and only one no to kill a project, jeopardy multiplies as management layers increase." (Quinn, 1985)

When planning and conducting experiments, several factors from communication of ideas, time and team management and setting goals for experiments should be taken into account in order to gain valuable insights from experiments with reasonable amount of resources. Strong hierarchy and heavy bureaucracy are likely to hinder experimentation whereas autonomy of employees and shared goals and good communication of ideas essential for it.

According to Quinn (1985) although goals are important for successful planning of experiments they should, however, be kept broad, in order not to create undue oppositions to new ideas. Flexibility should be maintained by not defining intermediate steps in detail and by trying alternate options and routes. Identifying and solving problems at early phase fosters momentum, confidence and identity towards novel approaches. Furthermore, sufficient amount of information about the project and progress should be offered in order managers to follow and realise the work performed. (Quinn, 1985)

Furthermore, small teams tend to handle communication and commitment among team members better, while as few management layers as possible decreases the jeopardy of rejection (Quinn, 1985). Routine work should encourage information exchange, allow feedback and through trustworthy culture decrease defensiveness (Argyris, 1994). By promoting open communication, idea and ongoing information exchange with internal and external team members as well as encouraging information seeking from different perspectives and sources is likely to enhance creativity (Ancona and Caldwell, 1992; Dougherty and Hardy, 1996). In addition, experimenting and sharing ideas and information in as early stage of development process as possible and throughout the process remain essential (Thomke, 2001).

According to Thomke (2003) experimenting requires openness for constant changes in practices and processes and Shalley and Gilson (2004) state how organisational and team structures and hierarchies affect on innovation and experimenting. Relationship between formal reporting and responsibility levels are essential: highly bureaucratic organisation discourage employees to reach for novel approaches and experiments, whereas organisation with flatter structure may enhance employees' autonomy and creativity. Employees may be likely to perceive presentations of organisations structure and hierarchy as discouraging and only highlighting how employees are not allowed

or encouraged to make decisions on their own. This leads to less enthusiasm for trying out new ways of working and developing. In addition, heavy bureaucracy demanding lot of time and effort from employees to get novel ideas forward in the organisation is likely to destroy the enthusiasm of employees. (Shalley and Gilson, 2004)

The amount of experiments at the same time and place should be considered. Simultaneous experimenting keeps the learning speed high, whereas sequential experimenting is likely to delay the overall process. However, too many experiments conducted at the same place may increase the amount of surrounding noise and affect the results of experiments. Thus, capacity and amount of experiments need to be managed. (Thomke, 2003) Overall, according to Amabile and Khaire (2008) constant experimenting should be the goal of working until sufficiently is learnt from the process and desired product or service.

Lee et al. (2004) have studied the inconsistencies that are likely to inhibit experimentation behaviour. Where current research claims how affecting on one organisational condition is likely to foster behaviour essential for innovation, this approach reveals how changing only one organisational condition may lead to inconsistency between work tasks and expectations and lead to decrease in willingness to act towards innovation. Example of inconsistency in organisational conditions can be found from the behaviour of Bank of America's management levels. In order to show support for essential failure and to communicate how novel ideas are not able to rise without it, senior management set the failure rate in 30 per cent. This was supposed to indicate sufficient risk taking and novelty. Concurrently, rewards and employee compensation remained to be based on traditional measures of performance. This lead to inconsistency: the aim to increase innovation and novel ideas was contradictory to the reward system. If an employee spent a lot of time and effort on experimenting and faced failures, his rewards were likely to suffer. (Lee et al., 2004)

4.4 Leadership behaviour

Managerial practices for technological innovations have been widely studied, and many innovation researchers have stated leadership behaviour playing major role as a factor affecting innovation ability of organisations (Buijs, 2007; Jung et al., 2003; Jung, 2001; Amabile, 1998; Mumford and Gustafson, 1988) as well as employees' creative capabilities (Mumford et al., 2002; Jung, 2001; Amabile, 1998; Hennessey and Amabile, 1988).

According to Jung et al. (2003) leaders are able to affect both directly

and indirectly in their employees' and company's ability to innovate. For instance, empowering employees and building organisational climate optimal for innovation refers to indirect affecting. Understanding of individual's creativity and ways to influence and improve it gives managers guidelines when creating an environment and leadership that support organisational innovation and experimenting (Redmond et al., 1993).

A leader can have an affect on employee's level of creativity through leadership behaviours such as problem construction, learning goals and feelings of self-efficacy Redmond et al. (1993). As leaders play a major role in establishing, influencing and shaping organisational culture and climate through their communicated values and beliefs, they are able to shape the organisational culture into more innovative direction and foster creativity and experimentation in an organisation (Jung et al., 2003; Schein, 2010) for instance by nurturing organisational climate that supports creative efforts and learning (Yukl, 2002). According to Quinn (1985) the essence lays in accepting the chaos of development and focusing on early prototyping and iteration.

Following subsections describe in more detail how leaders can affect experimentation behaviour of employees by creating safe and supporting environment, acting as a role model and allowing sufficient resources for experimentation.

4.4.1 Creating safe and supporting environment

Employees are more likely to conduct experiments in a psychologically safe environment described in section 4.1.1 and leaders have a great role in creating an ideal environment for experimenting (Quinn, 1985). Leaders can decrease the fear of failure, motivate, define goals and focus as well as show support for employees. These aspects are outlined next.

Decreasing fear of failure

As described in section 4.1.3, employees are not likely to take interpersonal risks when a leader acts in authoritarian or punitive ways, and responses to questions or challenges in defensive manner (Edmondson, 1999). In order to decrease the fear of failure and risk-taking, Amabile and Khaire (2008) and Amabile et al. (1996) suggest leaders should emphasise how constant experimenting requires failing early and often and through iterations learning is possible. Furthermore, speaking out loud ideas or making mistakes should not result in punishment or humiliation, and leaders should act in supporting and coach-oriented manner (Edmondson, 1999). Overall, training and coaching seem to be useful approaches for leaders, who pursue to contribute

employee's self-efficacy and team effectiveness essential for experimenting (Amabile, 1998).

However, showing employees the support and tools for failing fast and early remain challenging (Farson and Keyes, 2002). Bank of America's top management serves an example how management level can show their support and commitment towards experimentation process. When setting up an experimentation laboratory in some of their banks in order to test ideas in real environment, some employees were afraid of their rewards and bonus scores getting harmed as a consequence of failed experiments. This decreased the willingness to experiment novel approaches. Senior management decided to abandon the conventional bonus system in the test branches, and instead reward employees based on team performance. This lead employees feel they were special and being supported in experimenting. (Thomke, 2003)

Defining goals and focus for employees

According to Barczak and Wilemon (1989) leader's task is to provide clear focus for the work of employees. Oftentimes requesting creative and innovative solutions may lead to more creative results of individuals (Amabile et al., 2002). According to Hackman (1987) setting directions and goals to employees also influences positively on team effectiveness.

As undertaking novel approaches to work oftentimes involves risk-concerned decision-making, employees should be offered decent level of guidance, goals and some measure of structure (Jung et al., 2003). Also Redmond et al. (1993) states how leadership plays a major role in defining group goals, controlling resources and providing rewards through interactive leadership process. Leader not taking an active role in supporting and guiding the work of his employees may lead to organisational units working at cross-purpose. (Jung et al., 2003) However, according to Mumford et al. (2002) leaders' planning and guidance should focus on progress, projects on general level and implementation of the results of projects instead of focusing on offering detailed guidance on piece of work.

Local leaders are in essential role in directing and evaluating work of employees, facilitating and allowing resources and information as well as encouraging employees to engage with the tasks and team members. (Amabile et al., 2004) Supporting actions include defining and setting appropriate goals and tasks Amabile (1998), showing the work group support and confidence within the organisation, showing appreciation of individuals contributions to the project, focusing on efficient and good communication, and listening novel ideas with open mind. (Amabile et al., 2004)

Motivating employees

Creativity, exchanging ideas and turning them into action requires intrinsic motivation from employees (Jung, 2001), and according to Amabile (1998) leaders should foster organisational culture in which individuals find their motivation in divergent thinking and experimenting new ways of performing tasks. Furthermore, fear of failure is likely to be decreased through leadership that fosters the culture of intrinsic motivation, rewards from creative endeavours, idea exchange and open discussion Amabile (1998). According to Sosik et al. (1999) leaders should concentrate on vision of work and its outcomes that is meaningful and motivational enough to inspire employees.

Also Amabile et al. (2004) emphasise in their componential theory on creativity the support of immediate supervisors as a way to enhance employee's creativity and intrinsic motivation, which also affects employees willingness to conduct experiments.

Leaders can affect employees' creativity and innovation skills both directly and indirectly (Jung et al., 2003). By stimulating employee's intrinsic motivation and higher level needs leaders are able to affect directly on employees' creativity (Tierney et al., 1999), where indirect way may be through establishing a work environment where new ways of doing are encouraged and failure is not being punished (Amabile et al., 1996). Leaders who create and support a reward-system that values creative performance, provides both intrinsic and extrinsic rewards for employee's efforts to learn new skills and to challenge status quo by experimenting new approaches, increase employees' willingness to constantly engage in creative endeavours (Jung, 2001; Mumford and Gustafson, 1988).

Offering and receiving valuable feedback serves as a key function of leaders and one of the most challenging tasks they have, that has its affects on employees willingness to conduct experiments (Amabile et al., 2004; Amabile, 1998). According to Shalley and Gilson (2004) giving performance feedback is essential for creativity and accordingly difficult: creativity often involves approaching problems from new approaches, concurrently experimenting novel things includes risk-taking.

Showing support

Empowering employees is an essential tasks of leaders, through which a work environment is created where employees desire to seek innovative approaches to perform their work tasks (Jung et al., 2003). Transformational leaders encourage employees to participate in developing by highlighting the importance of cooperation, providing the opportunity to learn from shared expe-

rience and allowing employees to perform necessary actions in order to be more effective(Bass et al., 1990).

Idea generation is an essential phase of experimentation process. Leaders need to acquire resources, encourage idea generation (McGourty et al., 1996) and support employees to break routines by stating how essential experimenting, iterating and failing is for learning and developing (Amabile and Khaire, 2008; Shalley and Gilson, 2004). Leaders supporting new ideas and idea exchange has been related to enhancing creativity especially among those employees who showed disposition towards creativity (Oldham and Cummings, 1996). Leaders should create an environment where idea generation is possible (Andrews and Gordon, 1970). This is likely through leaders who support and encourage employees, provide them autonomy in decision-making and everyday tasks, and communicate openly with employees (Oldham and Cummings, 1996; Tierney et al., 1999).

Also Mumford et al. (2002) introduces idea generation and safe environment for ideas to emerge as essential tasks for leaders to support. Idea generation can be enhance by idea stimulation, education of various problem solving techniques, support for novel ideas, involving employees in developing ideas and allowing them freely pursue ideas. In addition to idea generation, idea structuring phase consists of creating action or project frameworks so that employee's have as much autonomy to perform the task as needed. (ibid)

Buijs (2007) states how leaders dealing with uncertain and new innovations should stay certain about uncertainties and provide a safe environment and encourage employees to work on current task comfortably. Thus, high level of tolerance for dealing with different states of minds and various personal feelings is required from a leader. (Buijs, 2007) According to Mumford et al. (2002) essential element of safe environment includes a leader being in charge of conflict management.

However, in addition to contextual factors and environment, studies show level of support, control and assist an employee needs depends on personal characteristics. Thus, leaders knowing and understanding their employees is essential in order to provide employees sufficient support. (Shalley and Gilson, 2004)

4.4.2 Role-modelling

According to Mumford et al. (2002) experimentation requires special leadership style. General leadership styles and practices are set for industrial management, whereas at present the focus should be on leading the people in a collaborative way, from authoritarian style to increased autonomy and trust. Furthermore, conventional models of leadership are not likely to en-

courage employees to challenge the status quo but to achieve required goals. (ibid) This change from authority-based leadership to collaboration with employees has occurred in literature and in practice (Amabile and Khaire, 2008; Farson and Keyes, 2002).

Team member's collective view of support they get from their leader has been related to the team's creative endeavours and success in them (Amabile, 1998; Amabile et al., 1996). In order to encourage creativity and experimenting in teams, leaders should lead by example and act as role models. Leaders should consider their own behaviour and actions in a way that stimulates employees to new and innovative, creative approaches to problems. (Mumford et al., 2002; Amabile and Khaire, 2008; Waldman et al., 1990) Katz and Kahn (1978) refer to role of the leader in a sense where leader defines by his example the reality of workplace; norms, practices and culture. According to Mumford et al. (2002) leaders acting as role models is essential element of safe environment.

Through the green light given and their own example leaders can change the focus from success and failure into thinking in terms of learning and experience. (Farson and Keyes, 2002) Also Amabile et al. (2004) consider leader being a role model for employees essential for enhancing employee's creativity and intrinsic motivation.

By defining organisational culture, climate and group norms leaders shape the way of working of employees. Through such role-modelling and mentoring process leaders also show employees how tasks are performed. Employees, in turn, follow the example of a leader in order to achieve high level performance. (Redmond et al., 1993) Role-modelling stands also as powerful tool for opening employee's eyes and attitudes to new perspectives, 'thinking out of the box' and adopting generative and exploratory thinking processes (Jung et al., 2003; Sternberg et al., 1997) influencing creativity of an employee (Shalley and Gilson, 2004).

Changing overall organisational climate is challenging, yet various components are reasonably manageable and should foster creativity. For instance, risk-taking and constructive feedback can be supported through role modelling of the management. (Shalley and Gilson, 2004) Team members observe and reflect other members responses and actions and attend to them, yet behaviour of the leader is often their particular concern (Tyler and Lind, 1992). In addition to supporting idea generation, leaders need to commit to the experimentation process by evaluating employees' ideas and integrating them to organisational needs (Mumford et al., 2002).

Farson and Keyes (2002) define a concept of failure-tolerant leader, who puts effort on explaining to employees how essential failure is for the development process as a whole, and how actual failing refers to a point where

surprising, failed outcomes are not reflected and further analysed in order to learn. Performing accordingly, admitting own failures and not chasing anyone to blame, failure-tolerant leaders encourage failure, lower the threshold and ease the fear of failing of employees. (Farson and Keyes, 2002)

Furthermore, failure-tolerant leaders treat success and failure similarly, analysing and reflecting the outcomes in order to grow the intellectual capital of the team, including experience, knowledge and creativity. Other characteristics of failure-tolerant leaders are being rather collaborative than controlling, listening carefully, seeing the bigger picture, asking questions and focusing on the development and future rather than blaming on mistakes. In addition, in order to gain empathy and trust among employees, leader should admit their own mistakes, as it shows self-confidence and honesty, assisting in forming closer ties with employees. Vulnerability and transparency play a major role in trustworthy relationship between leader and employees. (Farson and Keyes, 2002)

4.4.3 Allowing resources

Top management and immediate superiors can affect and support employees' experimentation behaviour by allowing different resources experimentation requires. The most urgent resources are time for creative thinking and experimenting, material resources and autonomy over employee's own work. Amabile and Khaire (2008) and Katz and Allen (1985).

Prior studies show how creative efforts of employees require remarkably time and energy (Gardner, 1988; Getzels and Csikszentmihalyi, 1975), big ideas do not hatch overnight. Furthermore, trying out novel approaches and conducting experiments require more energy and is overall more challenging for employees than performing and sticking to the routine tasks. As it takes more cognitive resources to generate several alternative solutions, practice divergent thinking and approach problems from different perspectives, allowing time for creative work and thinking is essential (Amabile et al., 2002; Shalley and Gilson, 2004). According to a study of Amabile et al. (2002), employees working on high time pressure affects negatively on ability to engage in creative cognitive processing. In addition, analytic and creative thinking are prevented under stress, heavy workload and too tight schedule and ability to recognise and react to problems and learn from experiences deteriorates (Garvin et al., 2008).

Thus, clear time should be allocated for developing especially when the aim is to flourish idea generation, creativity, learning and experimentation of new concepts (**amabile1987creativit**; Amabile et al., 2002; Redmond et al., 1993). However, no sense of urgency leads employees easily to auto-pilot

mode, in which routine tasks are performed without further thinking and analysing (Amabile et al., 2002).

Katz and Allen (1985) found in their study how uninterrupted time was considered critical for engineers working on novel technologies. Indeed, lack of time and resources may serve as a hindrance to employee's willingness to take risks and perform experiments (Jung et al., 2003). Through leaders who allow their employees to participate in developing and ideating, reserve budget for it and set it as a part of performance standard, the hindrance for risk-taking may be lowered (Jung et al., 2003).

Furthermore, leaders can assist their employees by recognising times with high pressure, and allowing employees to focus on certain thing at a time, leaving the expectations of creativity and new ideas into the future endeavours, when time pressure has decreased. On the other hand, if creativity is required under stress, leader should transparently explain the importance and reasons behind the strict schedule and required goals. Thus an employee may relate to the problem at hand and engage better at his work. Indeed, helping people to understand the importance of work is essential especially under high time pressure. (Amabile et al., 2002)

Autonomy and freedom to perform essential tasks has major effects on organisational creativity, as individuals are more likely to produce creative work when having the feeling of personal control over how to approach given tasks (Amabile et al., 1996; Shalley and Gilson, 2004). Furthermore, allowing employees freedom to act actually arouses desire to act (Kanter, 1983). Yet, in order to maintain organisational innovation and risk-taking, autonomy given to an employee cannot be in contradiction with fear of failure or discouragement towards challenging status quo or trying out novel solutions (Yukl, 2002).

Furthermore, too much autonomy, meaning full control over planning and conducting the work and experiments, may lead to negative consequences and contradictory goals between employee and organisation. (Shalley and Gilson, 2004) Thus, setting appropriate goals and understandable requirements that inspire employees is essential. Furthermore, leaders need to realise whether the goals require creativity or lead to creative outcomes, and not anticipate creativity or creative outcomes and instead accept employees being less creative where it is not needed. (ibid)

Organisational structures affect in the traditional roles of leadership as a means of direct responsibility given to employees. The trend of flatter organisations provides more autonomy to employees, whereas leaders' role transforms to more involved in external resource acquisition and managing the interfaces. (Shalley and Gilson, 2004) Also according to Amabile and Khaire (2008) much success rises from employees' own initiatives, which re-

sults from wide amount of autonomy at work. (Amabile and Khaire, 2008)

Leaders task to promote ideas and results of experiments to upper levels of organisation serve as a major way to insure sufficient resources and support for the idea implementation. (Mumford et al., 2002)

In order to be creative and conduct experiments sufficient access to material resources should be allowed for employees (Katz and Allen, 1985). However, even though material resources are essential for creativity, studies have suggested a contradictory perspective: when employees have access to wide range of material resources, their creativity tendencies may decrease. This may happen due to the creative actions and thoughts an employee needs to perform when needing certain resources to finish his task but not having them at hand. This, in a way, stretches employees' skills to think differently and achieve goals. (Csikszentmihalyi, 1999) Thus, Csikszentmihalyi (1999) states how resources are likely to make employees feel too comfortable and lead to decrease in creativity.

Under some circumstances, according to Monge et al. (1992) group communication is likely to increase innovation. Thus, leaders should consider managing wide range of formal and informal meetings and facilitated discussions in order to create opportunities for ideation. Furthermore, innovation occurs over time and is a dynamic process. Leaders should be sensitive in which pace more managerial impact is needed, and in which pace of the process more freedom and autonomy should be allowed for employees. (Monge et al., 1992)

When brought to wider scale of innovations, a company desiring for innovation should allocate resources and define long-term goals and actions accordingly. Even though companies urge to invest most resources in current lines, sufficient resources should be allocated for long-term growth and innovation. This includes providing an environment strong enough to seize surprising opportunities and tolerate unforeseen threats in all organisational, technical and external relations levels. (Quinn, 1985)

4.5 Summary

The aim for this chapter was to from a consensus on current research concerning factors affecting experimentation behaviour. As experimentation has not yet been widely studied, research from innovation and creativity were included together with organisational behaviour and leadership research.

Psychological safe environment resonates well with the environment aimed for experimenting. In psychologically safe environment employees do not fear being rejected, ask naive questions, make mistakes or present viewpoint of

minority. In contrast, psychologically safe environment enables employees comfortably express their thoughts at work. Appreciation of differences is important, as opening minds for different ideas and world views increases both energy and motivation, brings out fresh thinking and are all essential for experimentation behaviour. (Garvin et al., 2008)

When developing novel products and processes, iteration and failure are included, employees need to feel safe to try various approaches and fail (Shalley and Gilson, 2004). As discussed earlier, organisational culture has great influence on employee's perception of safe environment for failing. Employees should be encouraged in risk-taking, exploring and testing uncertain approaches (Garvin et al., 2008). As failures bring most value to the process, it should be encouraged (Thomke, 2001) and considered as an opportunity for learning and growth (Farson and Keyes, 2002).

In order truly novel things to emerge through experimenting and employees to learn and engage to their work, top management and leaders should allocate creative time for playing with ideas, brainstorming, learning and experimenting (Amabile et al., 2002). Additionally, employees should be provided with sufficient access to material resources (Katz and Allen, 1985) and autonomy on experimentation (Shalley and Gilson, 2004).

Creative thinking and actions require time, and contradictory, in fast-paced and rapidly changing world and working environment managers should allocate employees sufficient time for creative thinking and experimenting novel approaches (Shalley and Gilson, 2004).

When combining routine work and innovative experimenting, needs to be noticed that the threat for inconsistencies and causing confusion to employees rises. Thus, creativity, learning and experimentation and their dynamics should be understood as well as the consequences inconsistent signals and requirements may lead to (Lee et al., 2004).

5 Research methodology

This chapter presents the empirical research design. First, case study method used in the study is presented in detail. Second section presents data collection process following detailed description of the data analysis.

5.1 Case study as a research method

Considering the complex and uncertain characteristics of organisational and human behaviour under study, qualitative research was used. According to Morgan and Smircich (1980) qualitative research serves as a great approach especially well when exploring social phenomenon in real life context.

The most recognised case study research is based on the work of Yin (1989) and Eisenhardt (1989). According to their perspective, case study refers to a method dealing with contemporary phenomenon in real life context. Case study method is ideal in studies where boundaries between the phenomenon and its context cannot be clearly delimited. (Yin, 2014) According to Eisenhardt (1989) no theory is necessarily needed in the beginning of the study, yet some basic theoretical assumptions are required to use as a guidance in the empirical world. Research questions and boundaries of the study are expected and allowed to change during the study. Thus, in the beginning of the study too strict premises might even create biases and limit the results. (Eisenhardt, 1989)

When in the field of qualitative research, case study method can be used both in theory building and theory testing. Furthermore, it can also serve as a method for interpretive research design, which allows the constructs of interest emerging from the data and not to be defined and known in advance. In interpretive research social reality is seen as embedded within their social settings, as well as it is impossible to abstract it from them. Researchers then focus on interpreting the reality using sense-making process in comparison to hypothesis testing process. (Bhattacherjee, 2012)

While case studies are allowed to bring forth theories from empirical data, the empirical findings need to emerge through theory. Theory and empirical findings are mutually dependent: the empirical data affects theories and theories need the verification from empirical findings. Thus, oftentimes case studies are conducted iteratively, the whole process including retesting and

redefining of theories. (Dubois and Araujo, 2004)

According to Yin (2014) the ideal usage for case study is when aiming to answer 'how' or 'why' -questions, when participants cannot be manipulated and when real life context is significant for the study as well as when the case and the context boundaries remain complex or unclear. These aspects resonate well with this thesis, as the focus is on identifying factors affecting experimentation behaviour of employees and how it can be fostered in organisations. Participants were only given an introduction to experimentation-driven development, and their behaviour during the challenge depended solely on themselves and the work team, and researchers could not manipulate participants. When studying factors affecting experimentation behaviour in organisations, real life context is significant, yet boundaries of the work and the context of developing remain complex and unclear. (Yin, 2014)

In this thesis, initial research questions were formed based on previous empirical and theoretical findings of experimentation-driven approach on organisational innovation. Urge to study how experimentation-driven process could be fostered in organisations served as an inspiration for the case study setting and literature review. Deeper study on literature review was conducted after gathering empirical data and rising relevant themes to study further: learning and creativity in organisations, experimentation-driven approach as a tool for learning and factors affecting experimentation behaviour.

To enhance the credibility of this research, systematic and transparent description of the research methodology, data gathering and analysis process is offered. In addition, quotations from the data are presented widely in the results and in the analysis process two researchers and supervisor of the thesis have been involved.

5.2 Data collection

In this section, an overview of the client organisation and the description of the study setting, an experimentation challenge, are provided. Finally, the interview process for collecting the data is described in detail.

5.2.1 Company description

The case company in this study is a client organisation of the MINDexpe project; Service Foundation for People with an Intellectual Disability (KVPS). The Service Foundation for People with an Intellectual Disability was founded by Inclusion Finland KVTL which is a non-governmental organisation aiming

to promote equal opportunities in society for people with intellectual disabilities and their families. The aim of the foundation is to promote a good life for people with intellectual disabilities and their families by lobbying decision-makers and legislators. They co-operate in advocacy work with NGO?s and other parties involved in the field. (*Kehitysvammaisten palvelusäätiö*)

KVPS promotes a person-centred approach to the lives of people with intellectual disabilities, promotes their full citizenship rights and carry out development projects and organise various kinds of trainings. In addition they offer wide variety of respite care services to cater for the different needs and situations of families and people with special support needs and acquire apartments for young people and adults with intellectual disabilities who wish to live on their own. (*Kehitysvammaisten palvelusäätiö*)

KVPS Tukena Ltd (later will be referred as Tukena), as part of KVPS, focuses on providing diverse, person-centred support services in partnership with local authorities and other providers. KVPS Tukena provides different solutions and housing services for young people and adults with intellectual disabilities who wish to live on their own, one of them being group housing. 10 out of 14 interviewees in this study were employees in several Tukena housing units in Finland. Rest of the interviewees worked in the operations development unit in various projects. (*KVPS Tukena Oy*)

Client organisation KVPS was interested in applying novel approach towards developing in their organisation, and through participating in the MINDexpe research project KVPS experienced experimentation-driven approach in action while MINDexpe benefited from the real life research context.

5.2.2 Experimentation challenge description

The aim of the experimentation challenge was to encourage employees to improve their work by generating novel ideas and test them in action, serve customer needs better and to introduce employees to experimentation-driven development. Through the experimentation challenge factors affecting experimentation behaviour were studied. The research team instructed a client organisation on using experimentation-driven approach by organising an experimentation challenge where the units of the client organisation were tasked to create, develop and report new ideas to develop their work during a six-week time period.

The challenge was organised separately for two client organisations of MINDexpe project: The K-Retailer's Association and Service Foundation for People with an Intellectual Disability (In Finnish, Kehitysvammaisten Palvelusäätiö, KVPS). The data analysed in this thesis is gathered from different service units of KVPS and KVPS Tukena Ltd, which is a part of

KVPS, focusing on providing support services for people with an intellectual disability.

The kick-off for the experimentation challenge for the management level was held in April 2013. As the approach for developing through experimenting is not yet widely studied nor recognised way of working in the client organisation, during the launching two researchers of MIND told briefly through examples about the approach. Furthermore, practicalities and frames for the competition were presented. The managers of the units were thus given the responsibility to bring the information of the experimentation challenge to their units. Researchers gave very brief introduction poster on experimentation and instructions for the challenge, further instructions during the challenge were not provided. The introduction poster can be found in appendix A.

Time for experimenting was from 24th of April until 11th of June. However, as it took few days for the leaders to inform their employees about the challenge, actual time for experiments was six weeks. During the challenge participants, employees of the company units, were asked to ideate ways to improve their work especially from the customer perspective. In addition, they were encouraged perform quick and easy experiments, reflect the learnings of them and report the experimentations through either an online or paper formula. Idea formula is presented in appendix B. In the formula employees were asked to describe the idea, experiment, how they conducted it, how it went and what they learnt; what was successful and what left something to improve. Intentionally, MIND team did not restrict the style, theme or ways of experimenting. This let participants participate in a way feasible for them, their unit and working pace.

Each unit participating experimentation challenge was responsible for its own activity. After the kick-off for experimentation challenge project leader called once to immediate superior of some units in order to gain knowledge how the team is contributing to the challenge and whether experimentations are conducted or not. However, no additional support or advising was given to units, and teams were self-driven in their activity.

Experiments were reported to the jury, which consisted of members from both the development and management team of KVPS and MIND researchers. Best experiments and best reflections (experiments that helped the team to reflect and learn more about the idea, whether or not the experiment itself was successful) were rewarded in the closing session of the experimentation challenge as well as the unit that performed most experiments. In the evaluation process, jury focused on how well the goal of an experiment was recognised and kept in mind, how useful the experiment was (for instance for work efficiency or customer satisfaction), and what was learnt from the

experiment.

During the experimentation challenge KVPS Tukena reported 33 experiments and 20 were reported by the foundation, so altogether 53 experiments were reported through an online form or traditional paper form. Experiments themselves were not further analysed in this study, as in the focus and interest of this study is the experience of an employee of the experimentation process.

Experimentation challenge was essential part of empirical study, which overall took place during the year 2013. The experimentation challenge was organised during the spring and summer, following the closing session with rewards and interviews of 14 employees during the autumn 2013. Detailed dates of the challenge are described in table 5.1

Table 5.1: Schedule of experimentation challenge

23rd of April 2013	The experimentation challenge was launched to the whole KVPS and Tukena Group
24th April to 11th June 2013	Experimentation challenge
20th of September 2013	Closing session of the challenge and rewarding winners

In order to better understand the practicalities and structure of the challenge, experimentation challenge was first pivoted with two units of KVPS and two stores of K-Retailer's Association, before the actual challenge for the whole organisation was launched. However, the data gathered for this study does not consist of the interviews made from the pilot challenge, yet they gave the direction and frames for the actual experimentation challenge and assisted in framing the structure for the interviews.

5.2.3 The method used

"I want to understand the world from your point of view. I want to know what you know in the way you know it. I want to understand the meaning of your experience, to walk in your shoes, to feel things as you feel them, to explain things as you explain them. Will you become my teacher and help me

understand?" (Spradley, 1979)

As quoted above, interviews are an essential method for gathering information of interviewees thoughts and experiences, feelings and knowledge, ideas and preferences. Open-ended and semi-structured interviews leave space for all of the above mentioned, leading to highly qualitative data. (Monroe, 2001) In order to form understanding of employees perspective and experience of experimenting, semi-structured interviews were conducted.

The empirical data comprises of 14 semi-structured interviews. Interviewees were employees from five different KVPS Tukena housing service units and KVPS foundation. The author carried out all the interviews face-to-face with the interviewees. Interviews lasted from half an hour to an hour. The interviews were recorded and transcribed. All interviews were held in the interviewee's mother tongue, Finnish, therefore all the quotes presented in the thesis have been translated into English. Interviews concentrated on finding advantages and challenges concerning experimentation behaviour and experimentation-driven development. The interviewees' roles and work experience are summarised in table 5.2.

As this thesis is written as a part of a MINDexpe project, and the data collected will be used as a part of other MIND researchers doctoral studies, collecting data from the perspective of factors affecting experimenting was not the only topic of concern. Thus, all of the data in interviews were not straightly relevant to interest of this thesis. This, in turn, was a fruitful position to conduct a case study with thematic analysis, as too strict hypotheses were not formed in the beginning of the study and more space were left to essential themes to rise from the interviews.

Interviews were carried out after the experimentation challenge. Interviewees were chosen from the units of KVPS and Tukena Group so that both units that reported many experiments and those who reported less or none were heard. Interviews focused on identifying factors affecting experimentation behaviour of an individual in organisational context and the effects experimenting has on an individual. The structure of the interview can be found in the appendix C.

If the interviewee had not taken part in the experimentation challenge the interview focused on finding whether the routine work of an interviewee consisted of characteristics of experimentation behaviour, for instance ideating. Discussions with immediate superiors of the interviewees as well as interview notes served as a tool for gaining an overall understanding of the routine work and attitude towards experimentation behaviour, but were not included in the research data.

Table 5.2: Work experience and work description of interviewees

Interviewee	**Years in current unit**	**Years of work experience**	**Work description**
1	over 10	over 10	Development of operations
2	1,5	over 10	
3	under 1	over 10	
4	over 2	over 20	
5	over 1	over 10	Daily routines in housing service unit
6	under 1	under 1	
7	under 1	over 10	
8	over 2	over 15	
9	over 1	over 1	
10	over 1	over 25	
11	round 2	over 10	
12	round 2	over 5	
13	over 1	over 10	
14	over 1	over 10	

5.3 Data analysis

Thematic analysis was used to analyse the data collected. It focuses on revealing themes rising from the data, emphasising the organisation and rich description of the data set. Instead of counting phrases of words in the data, thematic analysis aims at identifying both implicit and explicit ideas rising from the data. Coding is used as a primary process in the analysis of raw data. Through initial coding essentials from the data are recognised, and are further encoded into interpretations. These interpretations can further include recognising and comparing theme frequencies and co-occurrences. Thematic analysis is considered as a valuable method in revealing the complexity of meaning within a data set. (Braun and Clarke, 2006)

Whereas closely related method grounded theory focuses on theory building about the social phenomenon being studied, thematic analysis can be used more flexibly without detailed knowledge of theoretical framework. (Bhattacherjee, 2012) In this thesis, thematic analysis assisted in recognising and

identifying factors affecting experimentation behaviour of an employee in organisations.

Analysis process followed the idea of Braun and Clarke (2006) step-by-step process, which is used to identify, analyse and report patterns within data without being tied to any pre-existing theoretical framework. The process consists of six phases: becoming familiar with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the final report. Next, analysis process of this study is presented. Along the analysis method, the author wrote research diary, which collected the phases of empirical analysis process.

1. Becoming familiar with the data

In the first phase the aim is to become familiar with the data by reading and re-reading it noticing especially occurring patterns. (Braun and Clarke, 2006) The author transcribed four of the interviews; the transcribing of the rest was outsourced. In addition, interview notes were read in order to form understanding of highlights and to get into mindset of categorisation. After all interviews were transcribed, they were read through in order to create a preliminary understanding of the data collected.

Transcribed interviews consisted altogether 140 pages, as each interview was approximately 10 pages.

2. Generating initial codes

Second phase of the analysis process consists of initial coding of the data. This is done through identifying patterns that occur. The data is collapsed into labels in order to define categories for further analysis. (Braun and Clarke, 2006)

Initial coding was conducted by the author labelling and commenting rising patterns and key words in the transcribed data. MS Office Word and its comment function was used to document the initial codes. For instance, if the quote from the interviewees included description of leader's support towards experimenting, the label for the code was "leadership behaviour" or if the interviewees described getting support from their colleagues towards telling ideas out loud, the label was "team support".

3. Searching for themes

In the initial coding phase various labels were created and in the next phase search for more patterned themes continued. In this phase initial codes were combined into overarching themes.

After the second phase coded and labeled interviews were printed. Together with two researchers author read through all the labels and initial categorising under themes that seemed most appropriate was made. In order to be able to discuss about theme creation and make it transparent and clear, essential quotes from the printed papers were cut with scissors and collected into piles forming initial themes.

Both factors affecting experimentation and the experience of experimentation were recognised and were taken into account in categorisation process. The initial categorisation can be seen in the table 5.3. Each category consisted at least of 10 quotes of interviewees on the same theme.

Table 5.3: Initial categorisation

Factors affecting experimentation	Structures and practices Business field Job description Process Idea Influence of an immediate superior Understanding of experimentation Climate Individual characteristics Licence to conduct experiments Co-creation Expertise Knowing of the customer
Experience of experimentation	Individual Idea Process Team Making abstract ideas concrete

4. Reviewing themes

As can be seen in table 5.3, various categories were identified in the initial categorisation. However, the categories were rough and needed specification and further analysis. The analysis process continued with combining and

examining the categories, leading to the second categorisation, which is described in table 5.4. More appropriate themes and refinement of categories was done by bringing together themes that were closely connected and eliminate those without many quotations. This phase was done with assist of the instructor in order to enhance the credibility of the study.

In this phase, context dependent organisational and business variables (business field) were considered as one category, yet in order to keep the focus, this was further left out of the review and analysis.

Table 5.4: Second categorisation

Factors affecting experimentation	Structures and practices
	Business field
	Idea
	Leadership behaviour
	Climate
	Individual know-how
	Individual characteristics
Experience of experimentation	Emotional level
	Perspective towards work
	Personal development

5. Defining and naming themes

The aim of this phase is to define each theme, the aspects of the data being captured through it as well as the essence and highlights of the themes. (Braun and Clarke, 2006)

This step focused on describing categories and subcategories better to response to research objectives, as many of them were described in rather abstract level. The analysis process resulted in two classes, which were divided into categories presented in table 5.5. The name of the second class was changed from 'Experience of experimentation' to more detailed 'How experimenting affects an individual'.

6. Producing the final report

The final step of the analysis process consists of writing the description of categories and themes in detail. Results are presented in chapter 6. The description of categories and subcategories is presented through presenting

Table 5.5: Final classes and categories

Class 1: Factors affecting experimentation	Role of the immediate superior Role of the team Structures and practices of developing Characteristics and know-how of an employee The gap between an idea and experiment
Class 2: How experimenting affects an individual	Emotional experience and engagement Learning

most essential and general themes identified in the analysis process. Real quotes are chosen to represent general perspectives of interviews and whether the quote presents minority of interviewee's perspectives, it is mentioned separately.

6 Results

This chapter introduces the results of the study. Two classes of factors affecting experimentation in organisations were identified in the analysis process: factors that have an effect on experimentation behaviour of an individual and how experimentation affects an individual. These two classes are further divided into categories and subcategories described in this chapter.

6.1 Factors affecting experimentation behaviour of an employee

A suitable context for experimenting was defined by the interviewees through interviews, and several factors were identified that affect in a way or another on experimentation behaviour of an employee in an organisation. In the analysis process, five different categories were formed of factors affecting experimentation. Table 6.1 summarises those categories and subcategories.

The experimentation process consists of ideating, planning an experiment and conducting the experiment as well as reflecting and learning from it in order to start the iterative experimentation process. Factors affecting these phases were identified from the data.

6.1.1 Role of the immediate superior

Different kind of leadership behaviour that affects experimenting was recognised from the data. This category consists of actions an immediate superior can perform in order to encourage or discourage experimentation. Three main themes were recognised from the data, which are presented as subcategories Leading by example, Supporting ideation and experimentation and Giving license to do experiments.

6.1.1.1 Leading by example

According to the study attitude and actions of an immediate superior towards developing are important factors for the organisational unit as a whole. Interviewees claimed that experiments rarely happen if the immediate superior

is not involved in the experimentation process and his attitude towards new ideas and developing is passive or negative.

As interviewee 5 noted, especially when the work environment is passive towards developing and experiments, immediate superiors should act as role models and by own example create a trustworthy environment where employees can ideate and conduct experiments without fearing failure. Especially in a situation where an employee lacks support from colleagues for his idea and leading to disappointment, immediate superior can lead by example and join in the experiment in order it to occur and encourage the whole team to conduct experiments.

> "Often they get shut down, new ideas, which is very sad, then I do not feel like even trying anymore, and in this point the leader is required. That he joins and says that now we will try this.. then it will succeed, but if it is only among colleagues, they [experiments] usually do not happen." [Interviewee 5]

> "Our immediate superior is such a lovely person, real idea bank herself! – Luckily she is very development-oriented.. I mean it is nice that she does not stick to routines either." [Interviewee 11]

Altogether, experiments are more likely to happen in workplace when immediate superior leads by example in ideating and conducting experiments himself, as can be seen in the comment above from interviewee 11.

6.1.1.2 Supporting ideation and experimentation

According to the study immediate superior's support and encouragement towards experimenting was experienced highly important in order experiments and ideation to occur among employees. Interviewees reported how the support from the immediate superior gives freedom to try out new practices, be creative and ideate together. This can be recognised from the comment of interviewee 14. Support from the immediate superior also encourages an employee to test ones limits, utilise one's working experience and abilities.

> "Both the immediate superior and the nurse in charge supported right away when they knew I am good at handwork, so they told me to use it as much as possible and experiment with customers.. and they told everyone the same."[Interviewee 14]

The immediate superior of an employee acts also as a bridge between the employees and upper level management bringing ideas from the organisation

unit to upper levels. Few interviewees reported their immediate superior being extremely supporting and fighting for employees' ideas. According to interviewees, these superiors received support from upper level management as well.

> "And if we talk about even bigger experiments, so that we have to ask from upper level management, she [immediate superior] usually conveys our ideas further. So we get quite well support from there as well and it is only rarely when some idea is being shut down right away." [Interviewee 10]

In most occasions where interviewees experienced support and encouragement towards experimentation, an immediate superior was himself very keen to developing, trying out new practices and experimentation-driven approach in work.

> "It [feedback and appreciation from the upper level management] makes the experiment more viable, appropriate and bold." [Interviewee 3]

According to the study some immediate superiors show appreciation and support by noticing and rewarding conducted experimentations or successful ideas. This gives employees feeling that the experimentation and their work is meaningful and is thus likely to encourage experimenting behaviour. Interviewee 3 states above, how the experimentation becomes bigger through appreciation and support.

6.1.1.3 Giving licenses to do experiments

An immediate superior cannot encourage and support his employees in ideation and experimenting with words only; he also has to allocate and allow resources for experimentation to happen. Thus, immediate superior is responsible for creating both environment and tools where experimenting is possible and resources are allocated for it. Every interview featured similar comments to that which interviewee 14 states below.

> "Experimenting is possible exactly because the management is positive towards things like that. It has direct influence.. and that I can buy equipment I need and I get a possibility to organise new kind of activities and they don't resist it.." [Interviewee 14]

Important part of allowing experiments and giving license to conduct them is allowing them to fail. If failing when trying something new is considered

punishable or the goals are exaggerated, it is likely to discourage employees to conduct experiments. In contrary, one interviewee described how his immediate superior gave license to do one experiment and promised to uphold an employee if some negative feedback or results occur from it.

Furthermore, immediate superiors may even demand developing and doing experiments by explicitly requesting creative and innovative solutions, as can be seen in the comment of interviewee 1.

> "She [immediate superior] will give space to that [experimenting] and actually even requires that we start experimenting and ideating. So, that is the idea of all these projects, to be able to create new ways of doing things." [Interviewee 1]

However, in some units there was a clear contradiction between the request of experiments and the resources allocated for ideation and experimentation. Again, in few units immediate superiors had taken this into account and provided time and resources for experimentation behaviour.

Furthermore, as interviewee 8 noted, an essential part of experimenting is it being voluntary.

> "In a certain way I think that workplace should encourage [to do experiments], but it cannot be forced.." [Interviewee 8]

Freedom to ideate and participate experimenting depending on own motivation and interests as well as freedom to not do so was experienced important among interviewees. According to the study there is a significant difference whether the leader or a team encourages an employee to do experiments or if he is forced to do so. When feeling free to try out new things, ideate and develop himself and his work without asking permission constantly from different parts, an employee is more likely to perform experiments and develop his work.

6.1.2 Role of the team

Several aspects on how different characteristics of the team affects on experimenting behaviour were identified in the study. Subcategories Democracy and low hierarchy, Supportive climate and team practices towards ideating and experimenting, Attitude towards failure as well as Engagement of the team are described below.

6.1.2.1 Democracy and low hierarchy

Few interviewees reported their organisational unit having a low hierarchy making it possible to perform spontaneous experiments and tasks without

asking permission and opinion from many parts. As interviewee 13 summarises, this was seen to lower the threshold and encourage experimenting.

> "The low hierarchy kind of.. when you are in a big institution you always have to sort out if you can get the car of the institution and many other things, so here we don't have those kinds of things.". [Interviewee 13]

However, most of the interviewees described the democratic view being strong in addition to low hierarchy. Overly democratic environment and decision-making in a team can either courage employees to participate in ideating and in experimenting or make the environment too passive for actually performing experimentations, when one always has to have the majority on his side in order to try out new things. Interviewee 6 emphasises this in the quotation below.

> "There is a lot this kind of where you have to take the whole work group into account, big workgroup, as team work of course takes its own time so that everyone will then be, involved in developing." [Interviewee 6]

> "So there are once in a while divergent opinions. But then we discuss, and we decide together what will be done. And everyone has to kind of work like has been agreed. So if the majority [of employees] says we will do like this, then we will do like that."[Interviewee 9]

Furthermore, when ideas are turned into experiments and practice, interviewees reported team size being a factor affecting on how efficiently or well experimentation is executed. When a size of the team is large, meaning over five employees, it is more challenging to get all employees involved and hear everyone's opinion. In turn, if there are no people to reflect one's ideas with, ideas may remain in one's head and never come alive. A compromise would be needed in between these aspects.

In addition, ways of sharing information and ideas among team is essential for experimentation. These aspects are presented more deeply in the next subcategory Supportive climate and practices.

6.1.2.2 Supportive climate and team practices

Climate among the team seems to affect a lot on how easily ideas are said out loud in a team and experimentations performed. Factors such as open

and creative atmosphere and support and positive feedback from colleagues have clearly a positive boost towards experimenting in an organisation.

A following pattern was identified from the data: Employees tend to ask opinion and permission from immediate superiors while also having a need for support from the team. Emerging ideas are preferably discussed with closest and most trustworthy colleagues in order to receive support, feedback, deeper understanding and reflection for employee's idea. Only after receiving other opinion and support are they brought to a team meeting under discussion. If the climate does not support ideating nor is safe for throwing ideas, employees are very unlikely to tell their ideas to others.

However, interviewees, reported conversations and ideating sessions together with the whole team being important as they may encourage others to ideate and tell their suggestions out loud. In addition, one is likely to achieve better results with a team than only ideating alone. One person reported realising it being important to say ideas out loud despite feeling insecure as it may lead to surprising outcomes and encourage more silent colleagues to participate in ideating.

In addition, interviewees described ideas starting to grow the more they are thrown into discussion, and the heterogeneity of the team being mostly inspirational and beneficial in ideation phase. Interviewee 6 summarises the power of ideating in teams.

> "But then I realise that the more I say my ideas out loud, others also get excited and ideas keep coming. So it is worth speaking, even though sometimes one might think that I cannot be always talking, so it is good to keep on talking and others will follow.." [Interviewee 6]

> "We also have few who are not that active in throwing ideas or performing and they like the routines, I guess the workplace could somehow support them in developing.." [Interviewee 11]

Furthermore, as interviewee 11 states above, team and climate should encourage and support employees to participate in ideating and experimenting in order an employee to overcome oneself and gently push towards new ways of doing things.

6.1.2.3 Attitude towards failing

While discussion and giving and receiving feedback are essential in ideating phase, license to fail plays a major role when an actual experimentation

is performed. Team being judgemental towards ideas and experiments can prevent actual learning and reflection of experimentations.

Thus, one part of the supportive climate towards ideating and experimenting is the attitude towards the results of experiments. Seems that if the climate in the team allows failing and does not take it too seriously, ideation and experimentation occur more often than if a team is afraid of failing. Quote from interviewee 1 describes attitude in their unit towards failing, several similar comments about trying again together and allowing failure were recognised from the data.

> "Well, no one will get punished or be thrown tomatoes at [if an experimentation fails].. I think we go through the idea and experiment, and try another way.. We do not have here that kind of attitude that we would not be allowed to fail." [Interviewee 1]

Most interviewees described the team being very supportive and attitude towards failure positive and constructive. They rather see failure as an opportunity or a learning point. Some interviewees described going through a failed idea or experiment among team in order to find an alternative way to test the idea. This attitude seemed to help the team in experimentation behaviour.

> "I think the team reacts very well to it [failing], kind of laughing and saying that these things happen and are part of this work."[Interviewee 6]

As interviewee 6 described above, humour was also described as an important way to cope with failures and to support team members in their work.

6.1.2.4 Team engagement

While most of the interviewees reported the workplace environment being very democratic and discursive, they described a high possibility that experimentations are not likely to happen if everyone in the team is not involved and engaged to turning idea into an experiment. Comment from interviewee 9 describes this further.

> "I think that the workplace has a major role [in experiments to happen], and especially that everyone are engaged. Thus we get things going and forward.." [Interviewee 9]

Interviewees reported feeling frustrated when realising how all colleagues who are involved in the experiment are not engaging to it, thus preventing

an experiment to happen and get relevant feedback from it. One way to motivate and engage the team was found from the data and is presented in the subcategory Characteristics of the idea and experiment under category Gap between idea and experiment. Furthermore, the team is more likely to engage to an experiment when the purpose of the experiment is clear and shared goal exists.

In addition, as interviewee 14 mentioned (see below), in order to foster the engagement of employees and the team, a team could encourage new employees to utilise their own strengths and ideate courageously. Few interviewees described their colleagues being highly supportive towards one's special abilities and skills, and encouraging everyone to use them freely at work. This was experienced as improving the level of engagement towards developing and ideating.

> "Every employee is allowed to use those resources and creativity that one has in the job.." [Interviewee 14]

Shared and understandable goal for an experiment forms a strong basis for idea turning into an experiment. According to the interviewees employees and the whole team is more likely to engage to the experiment if they understand in a deeper level the reason and goal for experiment. Thus, as following quote from interviewee 11 suggests, employees are more easily involved if the goal for the experiment can be clearly justified.

> "There we had a clear goal, that somehow we just have to make it work. Then we just processed it and nothing special, it was that kind [of an experiment] with a clear goal, yep." [Interviewee 11]

6.1.3 Structures and practices of developing

According to the study, various organisational structures and daily practices can support or prevent experimentation and ideation. First of all, the meaning of Resources allocated for ideation and development is presented. Secondly, seems that most of the units interviewed lack of systematic way for Collecting ideas, resulting to inefficient way of developing. In addition, in order the change actually happen implementing new ways of working has to be considered.

6.1.3.1 Resources allocated for ideation and development

Only little or no solid structure for ideation and developing was found in organisational units throughout the analysing process. Interviewees described

ideas usually emerging when a problem is encountered and an alternative way of performing is needed. In some occasions, ideas emerge accidentally in conversations with colleagues, team meetings and rarely in meetings where developing is a specific agenda. Rather than developing purposefully interviewees described their daily work as practice-driven.

> "It can be that some person suddenly brings a good idea or then we have a specific team meeting, where the idea is to develop something. Or then some new idea might come up in some bigger meeting by accident.." [Interviewee 4]

No time allocated for ideation and development of ideas leads easily to a situation where routines are repeated. In every interview time came to prominence as a lacking factor preventing ideation and experimentation from happening. Interviewees described the usual way for telling ideas and planning experiments being weekly or monthly team meetings with colleagues. As interviewee 1 states, however, these meeting usually did not include specific time for ideating and developing, more did they concentrate on routine issues. Most of the interviewees wished to have more time for ideation, developing and implementing experimentation-driven development to daily routine. Only one interviewee described having enough time for ideating.

> "Well, there is not that much time to ideate during them [weekly meetings]." [Interviewee 1]

At present, most interviewees described how developing is not seen as a routine part of work but as an additional part that needs time allocated for it. Few interviewees, like interviewee 2 above, experienced experimenting challenge as a refreshing way to remind the workplace of challenging conventions and the daily routine and even thought about it becoming an annual tradition. The interviewees described that reflection is more likely to happen in between different projects and in project-type work, and when the emphasis of the work is not project-like, developing is more likely to be put aside.

> "Once a year could be kind of more intensive period or so, maybe it would maintain that no one would be too routinised. And especially in these projects that last long, so long that they are actually no longer projects, it could be quite good.." [Interviewee 2]

One interviewee described peer resources being used only little in order to exchange ideas and best practices. He suggested more meetings and ideation sessions with peer colleagues throughout Finland or even abroad in order to

exchange opinions, gain perspective and find fresh, new and valuable practices to daily routine work.

> "Well, I guess the workload of some people is already so huge, causing also that people start doing things in the same way, continuing the routine.." [Interviewee 5]

Quote below from interviewee 5 clarifies how heavy workload can lead to repeating routine way of working. Sick leaves, heavy workload and hectic pace of work all affect on motivation and possibilities for developing and ideating. Furthermore, resources such as money were mentioned during the interviews as a lacking factor preventing experimentation.

In turn, interviewees who described successful experiments said an essential factor for the success was that all the resources such as people, equipment and time were at the right place at the same time and there where no hindrances preventing experiment. Thus seems that an aspiration for using resources efficiently is essential.

6.1.3.2 Collecting of ideas

In addition to rather usual communication problems in an organisation, the interviewed units lacked a working system for collecting ideas or feedback from experiments. The need for collecting ideas systematically was however recognised, as interviewee 5 emphasises.. Interviewees report daily work and notions in a system called DomaCare, and all employees are responsible for reading both those notes as well as ones from team meetings.

> "So of course during this one year we have had all kinds of good and bad ideas, and they are not documented.. So.. It could have been a good idea to document them.." [Interviewee 5]

However, DomaCare is not a place for new ideas, and people not reading what has been written in DomaCare remain a problem. Information is exchanged when work shift ends and other begins. Interviewees described through conversation essential information is likely to come up, thus telling about ideas and experiments should be obvious. For instance a situation where something has been already experimented before, but no reporting was made; without conversation the same experiment may be performed again, resulting to waisting time and other resources.In turn, interviewee 4 describes how successful experimentations are shared with a team.

> "But yep, if someone has experimented some good thing in his own project, it will be informed to others as well. Like hey this is

> what we have and this is worth experimenting. We have regular team meetings where information is shared widely, so we know what others are doing."[Interviewee 4]

The interviewees regarding reporting of experiments brought up somewhat contradictory points of views. Some interviewees claimed positive experiments being more under discussion and reporting, whereas others emphasised how failed ones raise more conversation and opinions among colleagues. However, clear and systematic practice for this was not recognised, and seems the most popular mode to share knowledge remains face-to-face conversations.

6.1.3.3 Implementing new ways of working

After experimentation being successfully executed, interviewees described the major difficulty lying behind the implementation process. Interviewees reported insightful experiments and solutions that would be important to implement in the daily routine. However, seems that structures and practices easily prevent implementing new ways of performing. For instance, new practice taking more resources in the implementation phase yet being more efficient and helpful in the long run, is more likely to be turned down and workplace sticking to old routines.

Interviewee 5 describes one way how interviewees have tried to ease the difficulty of implementing new way of working; Deciding person or people who are in charge of the change to happen in the beginning.

> "And then, if it requires actions and processing we agree on who will start to do it. So that it will not remain only in speech, as happens so often." [Interviewee 5]

Same phenomena and strong synergy to the difficulty of the implementation of a new routine is described in the subcategory Static Friction, which can be found under a category Gap between an idea and experiment.

6.1.4 Characteristics and know-how of an employee

In the analysis process occurred that individual characteristics and knowledge of an employee could assist experimentation-driven approach in development as well as prevent experimentation from happening. In this category these factors are presented in three subcategories. Substance know-how explains the extent to which prior working experience can both encourage experimenting and in turn lead to repeating routines and resisting change. Individual characteristics consist of the factors how tolerance of uncertainty,

employee's self-criticism and confidence affect experimenting. Attitude towards development of an employee also has a major impact on experimenting behaviour, whether an employee considers developing part of the work or not and whether he is open for new ideas and breaking routines.

6.1.4.1 Substance know-how

Most of the interviewees mentioned that prior work experience affects on the threshold for experimenting especially when experiments concern customers. Through substance knowledge an employee can gain wide understanding of the field, customer and ways of working, which can assist experimenting by adding the courage of the employee to perform an experiment. Knowing the customer, stakeholder and field of work are likely to add self-esteem and employees self-image as workers.

Those interviewees who were recently graduated and had little previous working experience described it taking time to get to know the routines and the organisational culture as well as customers before actually being ready to suggest anything new or perform experiments. They felt easily insecure and described it important listening to more experienced colleagues and asking their opinion about new ideas before experimenting. When asked what is needed from an employee to begin with performing experiments the interviewees reported experience and knowing what to do being essential. Interviewee 6 describes the meaning of work experience to the ability to be creative and ideate.

> "In the beginning it of course took some time for me to learn the basics of the work, so maybe my own creativity and ability to ideate now grows with the experience of this work.." [Interviewee 6]

Furthermore, interviewees who had several years working experience, like interviewee 14 below, considered as a positive factor that they were able to combine previous experience to present work environment and customers. Working with same customer segment in different units gives perspective of what kind of ideas can be easily experimented and what may need more effort and resources.

> "I used my previous experience as an instructor.. It was useful for this experiment.." [Interviewee 14]

In addition, working many years with same customers leads to a high mutual trust between an employee and a customer. This again eases suggesting new ideas and performing experiments with customers.

> "I think there is the gained trust that has grown during this working journey. So that.. I think there is no resident [customer] who could not join doing these [experiments]."[Interviewee 7]

In turn, many years of working experience from the same field and similar customer segments can also lead to repeating familiar routines and resisting change. Indeed, one interviewee considered essential that also newly graduated people or trainees with no prior experience are hired in order to more clearly perceive unnecessary routines and bring new and fresh ideas into workplace.

6.1.4.2 Tolerance for uncertainty, self-criticism and confidence

The way an employee tolerates uncertainty may have high impact on the experimentation behaviour. When asking how interviewees felt experimentation-driven approach affecting on their work a few of them described the difficulty lying in the feeling of uncertainty and incompleteness. Where some experienced uncertainty and incompleteness as threats and anxious factors in work, others emphasised those being factors that make working interesting. Interviewee 4 emphasises the ability to tolerate uncertainty and own failures.

> "On the other hand it [uncertainty] is richness in work, so that one will not get too routinised. But of course one has to tolerate the uncertainty and has to tolerate your own failures, like 'ok, this time I chose wrong'.."[Interviewee 4]

Furthermore, high level of self-criticism may prevent an employee from conducting experiments. Few interviewees described how they usually like to spend a lot of time in planning and refining a new idea before trying it in action. However, through the deadline and the pressure of experimentation challenge they were able to lower the level of self-criticism and try something incomplete. Interviewees learnt surprising facts already from the small experiment, and were overall satisfied experimenting even though they were not totally satisfied with the idea or experiment. As interviewee 4 states, a trifle of pressure can boost experimenting.

> "I would have probably thought about this idea for ages and be like this is not good enough yet and it is not perfect". [Interviewee 4]

Self-criticism is also likely to prevent an employee saying ideas out loud. An employee may feel insecure and that his idea is actually poor and not worth sharing. An employee may even feel scared of team member shooting down

his idea. As mentioned in the category Role of the team, a team can support its members to lower the level of self-criticism and encourage in ideating and experimenting.

In turn, some interviewees described throwing also wild ideas among a team, as they may lead to something good and encourage others in ideating as well, as interviewee 6 points out. Their level of self-criticism was considerably lower and confidence higher than the ones who were not that enthusiastic in sharing ideas out loud. According to interviewee 11, personality affects on employee's opinion on failure.

> "I sometimes say out loud stupid ideas as well.. It's that sometimes stupid ideas can lead to anything." [Interviewee 6]

> "I do think it depends on a personality. One has to be ready for failing and not fear it." [Interviewee 11]

Even though saying ideas out loud requires courage and confidence, it can be learnt by experience. According to the study the employees who had more previous work experience were also the ones who were more confident in telling ideas out loud and conducting experiments without fearing failure.

6.1.4.3 Attitude and motivation towards developing

Almost every interviewee brought up how attitude towards developing affects on experimentation behaviour. If an employee considers developing and learning new things important and part of the work, he is more likely to reframe failures as opportunities, be resilient in developing and find alternative ways of doing things that needs change.

If a team is not supporting employee's idea and experimenting, an employee has to have motivation to try again and find another way. For instance, if the team is likely to be negative towards new ideas, interviewees described telling their ideas first to a trusted colleague. After the support from a close colleague an employee feels he has enough confidence to tell the idea to the whole team. Interviewee 9 describes this phenomena in the quote below.

> "I guess I find the certain people to whom I [tell ideas out loud]. Then I dare to tell to others and as I have an urge to develop and learn, so through that I try.." [Interviewee 9]

Thus, the meaning of an employee's motivation and attitude towards developing and learning is remarkable. In one experiment an employee ideated and prepared a prototype during his leisure time and during the process learnt

new skills he had not known before. His motivation was so high it took him less than two weeks from the idea to actual prototype and first tests with customers. In turn, if an employee is not excited about learning new things, enjoys routines and prefers little change, he most likely will not be the first one to ideate or conduct experiments. As interviewee 14 states, developing requires action from an individual.

> "It [developing] requires activity from oneself and that an employee is willing to act and knows what he wants." [Interviewee 14]

Furthermore, in order ideation and experimentation to begin an employee has to be motivated and have the resilient attitude towards failing and learning from it.

6.1.5 The gap between an idea and experiment

According to the study an idea that is said out loud in an organisation is not always easily developed into an experiment or a new routine; there seems to be a gap between an idea and experiment. In this category factors related to idea and people involved that are critical for experimentation to happen are presented.

Interviewees reported several factors that need to be taken into account when moving from an idea to experiment, and those factors are here divided into three subcategories. Characteristics of an idea and experiment focus on how the size, riskiness and relevance of the idea and experiment can prevent or support an experiment to happen. In addition, a phenomenon called Static friction was recognised in the study, meaning that even though employees are excited about ideating and experimenting in the beginning, for some reason experiments still do not take place. Stakeholder distance and customer involvement consists of the importance of stakeholder and customer opinion on the experiment as well as mutual trust between different parties that experiment concerns.

6.1.5.1 Characteristics of an idea and experiment

Characteristics of an idea seem to have an impact on whether or not it is experimented. For instance, the simpler and more concrete the idea is, the more likely it is to be experimented. Experimentation seems to help in making abstract ideas into concrete things and reflect the problem more clearly. However, even though the idea gains positive feedback among workplace, it still might not be experimented. The more resources, planning and opinions

from different parts are needed in experiment and the more complex it feels among participants, the more likely it is to remain in ideation phase and not evolved into an experiment. Interviewee 1 describes below why an idea actually turned into an actual experiment.

> "It was as concrete thing as possible, that did not take too much.. or more negotiation with different parts.." [Interviewee 1]

The risk level of an idea affects on the bridge between throwing ideas and actually experimenting. When talking about performed experimentations interviewees, like interviewee 10 below, described the first ideas behind them being easy and simple, and especially possible to experiment with a low risk of anything bad to happen to customers or people involved in the experiment. In addition, interviewees reported that suitable experiments take into account the characteristics and possible limitations of the team or experiment.

> "But of course one has to think through that the experiment benefits everyone and it will not cause any harm to anyone."[Interviewee 10]

In addition, relevance and importance of an idea and the problem it attempts to solve are essential for the gap between an idea and experiment. Be the problem widely recognised among workplace, an attempt to experiment something new is rather likely to get support and engagement from colleagues and stakeholders. Likewise, according to the study if employees do not consider an idea important, and are not motivated to perform it, the idea will presumably be shut down by colleagues rather than considered from different perspectives or experimented nevertheless.

6.1.5.2 Static friction

Static friction in organisational environment came to prominence in the study. Static friction here means a workplace sticking to the routines and not being able to act in a different way and experimenting new ways of working regardless of eagerness towards new ideas and ideating. Employees are likely to get excited of ideas and even ideate eagerly together as a team, yet when it comes to implementation and actually performing experiments or do something differently, employees are no longer willing to take responsibility or be that excited about the idea. Interviewee 8 describes the phenomenon.

> "I think we are always so excited about everything, but when we start going through details and who will actually take charge of this and who will be involved, then I think we are no longer that excited.." [Interviewee 8]

In turn, as interviewee 3 put it, few interviewees described a situation where little or no static friction is recognised. Common factor to these descriptions is that when coming up with an idea, employees begin right away going through different possibilities and actions on how to perform an experiment or implement the idea and actually proceed with them. Yet in the study descriptions about static friction were in majority.

> "I start quickly ideating where I can contact next [in order to make perform the experiment or gain a certain goal].." [Interviewee 3]

> "One really learns from that [experimenting and developing], definitely yes. One only needs to begin and get involved, which is usually the hard part.." [Interviewee 5]

Even though interviewees emphasised learning and experimenting new ideas being essential for work, lot of resistance and inactivity occurred when actual experimenting was supposed to happen. Interviewees described even being surprised how after all the enthusiasm towards experimenting, no one was willing to take the lead and the experiment was never performed. Interviewees supposed and admitted that at times it feels too exhausting and difficult to break routines and it is easier to continue performing tasks as is used to.

6.1.5.3 Stakeholder distance and customer involvement

According to the study the relevance and closeness of the idea to the customer enhances the engagement for experiment of employees. According to interviewee 7, the need for a change rising from a customer, improves the likelihood of the idea taken seriously and experimented. The same applies when a clear need to try something new is present. This is usually faced as a problem in present way of working, yet it can also be an attempt to improve the quality of customer's life or the atmosphere at the workplace.

> "Especially when the idea rises from customer himself, we take every idea into account and consider everything that concerns a customer." [Interviewee 7]

In this specific working field experimentation that concerns customers needs permission usually from both customer and relatives. According to the study this is occasionally a challenging network to deal with, as the requirements and wishes from customers and stakeholders may be highly contradictory. Yet, worthy ideas also rise from relatives as well as relevant information of what has already been experimented with the customers and what was learnt from that. Interviewee 10 describes this phenomenon.

> "So relatives play a very central role in our customers' lives, and almost everything is still discussed and checked with them and ask for support from them, like can we do this. And some very good ideas may also rise from them. Or then it can be like 'Oh no, this has been experimented for 15 years now, and it doesn't work, so you should not start doing this.'.. So we have to remember that there is the network outside this workplace that is usually also involved in these experiments." [Interviewee 10]

Mutual trust between people involved in experiments is needed. Interviewees described mutual trust being a relevant part of experimenting, and experienced the trust especially among customers and stakeholders as highly important factor in order experiments to happen.

6.2 How experimenting affects an individual

In the analysis process another class was identified: the effects experimenting has on individual. This second class and its categories are presented in figure 6.2

Experimentation has an effect on employee on different levels. First of all, wide variety of emotions, such as excitement, fear of failure, disappointment and uncertainty is involved and rises up at different phases of the experimentation process. Secondly, experimenting helps an employee to learn and reflect on one's work as well as to gain process know-how of experimenting. It seems that through experimenting an employee is likely to encounter surprising outcomes that would not have been realised and learnt through planning.

6.2.1 Emotional experience and engagement

The study revealed that during the experimentation process an individual experiences wide range of emotions. Those factors are presented here in three subcategories, which are Positive emotions: Happiness, excitement, inspiration, boost to self-esteem, Negative emotions: Frustration, disappointment, fear of failure and fatigue and Engagement and motivation towards work. These subcategories are described and explained, in which part of the experimentation process they are usually faced.

6.2.1.1 Positive emotions: happiness, excitement, inspiration, boost to self-esteem

Experimentation usually begins with ideation, and in this phase interviewees described feeling creative, happy and excited. Ideating feels inspiring when colleagues support and join the ideating and plan together how the idea could be experimented. Interviewees described being excited and happy especially when the idea was their own or they were highly involved in ideating and planning the experiment. Furthermore, ideating as a group also felt more empowering than ideating alone and not getting support for one's ideas.

As Interviewee 4 states, positive results of experimenting, meaning that new way of doing things works better than the previous way, is likely to raise positive emotions. Interviewees described that getting good feedback from the experiments and ideas as well as getting support from both customers and colleagues raise positive emotions and give boost to self-confidence. Furthermore, a successful experimentation encourages experimentation behaviour and ideating and was described to nourish one's creativity, as interviewee 6 emphasises.

> "If something works better than before [experimenting], you get a good feeling out of that." [Interviewee 4]

> "Experimenting nourishes creativity and ability to throw oneself to something new." [Interviewee 6]

Among some interviewees the uncertain outcomes of experiments can also be seen as exciting and refreshing possibilities. As by experimenting new ways of performing work tasks are tested, experimenting brings exciting new aspects and challenges to routine work. Good ones tend to spread and may lead to something new and energetic and are likely to bring energy and stimulation to an employee. Interviewee 10 describes how experimentation brings stimulation to work.

> "So the experimentation kind of spreads. And I do also like routines and stuff: that things go in a certain way. But, it does bring stimulation to work, that we try out new routines." [Interviewee 10]

6.2.1.2 Negative emotions: frustration, disappointment, fear of failure and fatigue

Among positive emotions, interviewees described encountering various uncomfortable and complicated feelings throughout the experimentation process.

In cases where an idea of an employee gets only little or no support from the team or a manager, feelings of frustration and disappointment may occur. This phenomenon is likely to discourage employees to say their ideas out loud in the future and thus makes the level of employee's self-criticism higher. In the quote below of interviewee 14, is described the feeling of disappointment when encountering resistance from colleagues or team.

> "When you are totally excited about something [idea].. for sure there comes the disappointment like what is it now, why this idea cannot go through, what is it that is so difficult in this." [Interviewee 14]

While the outcome of experimentation is usually difficult to forecast and cannot be planned in beforehand, this has an influence on emotions of an employee. Tight schedule of experimenting and little planning combined to uncertain outcomes can raise anxious emotions. Saying out loud one's ideas might feel scary as the employees feel insecure about their idea. This forces them to encounter an uncomfortable fear of failure of their idea being shot down.

In cases where the experimentation in where all the people involved are highly excited about, does not reach the goals set for the experiment, it is likely to cause frustration, disappointment and sadness among employees. In most cases, interviewees felt failing personally when they felt that experimentation failed. Interviewees usually described experimentation as failed if it did not reach the goals set for the experiment.

In situations where there is no specific closure for the experiment or for some reason the experimentation is not finished, interviewees described feeling disappointed. This rather typical need for getting things done is described in the quote of interviewee 5.

> "Kind of disappointment, or kind of feeling of failure..' I always want to finish what I start.. So I do not like if things are not finished.." [Interviewee 5]

> "In addition, it [the experiment] cannot be too big, as it easily inflates.. so I think it is better to start, no matter how great idea there was, to slightly narrow it in some certain idea and then experiment that one. As I think many times it is a major hindrance that employees have no energy when the experiment inflates too much.." [Interviewee 8]

As described in quotation above from interviewee 8, the size of an experiment has an effect on the energy level of an employee. When planned experiment

is too large or complicated and tasks needed to perform it too challenging or numerous, lots of resources are consumed and the energy level of an individual is lowered causing fatigue.

6.2.1.3 Engagement and motivation towards work

The experience of experimentation and seeing the result of experimentation is likely to encourage employees in their work. Especially when the employees performing an experiment are satisfied with the outcomes of the experimentation, so that they consider it successful, experimenting improves the engagement and motivation of an employee towards his work. Furthermore, this encourages employees to be more creative and say out loud one's ideas as well as gives a boost to energy level.

As mentioned in the factors affecting experimenting, receiving feedback is important part of experimentation. In the field studied, employees work in a very close interface with customers and stakeholders. Thus, positive feedback from them raised positive emotions and encouraged to continue developing. Interviewee 10 states how important the feedback from work is for engagement.

> "But every time there is a good idea and it works when we try it, and we notice that it helps, of course it improves my performing in the work also in mental level. And there comes moments, with customers, when something works with them and we get positive feedback — of course it is very important. It then makes me happy and motivates, and encourages further on. Or feedback from relatives, if we get positive feedback from them, it again encourages." [Interviewee 10]

Overall, interviewees described they felt more engaged to their work when they were able to perform 'quick and dirty' experiments from which they get instant feedback. Ideating and new ways of performing work-related tasks through experimenting increased the meaningfulness of work and made it more interesting. In addition, through ideating and experimenting interviewees felt they have more influence on their own work.

6.2.2 Learning

Experimenting seems to have an impact on learning skills of an individual. Learning occurs in various levels, and three subcategories where learning was especially noticed were formed from the data. Reflection of work means that experimenting helps an employee to reflect ways of working and the work

overall. Secondly, through experimenting an employee gains deeper understanding of experimentation process, which is here called Process know-how. In addition, it seems that an experimentation process helps and individual to overcome anxious and insecure emotions described above, thus improving the Resilience towards work of an employee.

6.2.2.1 Reflection of work

According to the study experimentations helped to question conventional ways of working and offered wider, more objective perspective that helped to improve the work. Some interviewees noticed the same as interviewee 2; that stopping to reflecting one's work is not and ordinary practice for an organisation and its employees. Experimentation process helped employees to reflect and make the purpose of their own work clearer, as interviewee 8 emphasises.

> "Many things are done without actually stopping to think about them more, like would there be something to improve. It might be kind of quite typical way to act for an organisation, to forget further evaluation."[Interviewee 2]

> "Maybe it differs when.. you have to think, or you get to think, but let's say that you have to think some issue in a deeper level and maybe make your thoughts more structural and that you have some understanding from what you view your own work and work of others.. 'So it does give in a certain way a deeper understanding on how one is doing his work." [Interviewee 8]

As mentioned in the factors that affect experimentation, giving and receiving feedback is relevant in experimentation-driven approach. Receiving instant feedback improves learning process of an employee and the ability to iterate, meaning that an employee can reflect the outcomes of an experiment and improve his idea for another experiment and work overall.

Furthermore, interviewees described surprising outcomes of small experimentations they performed and said talking about experimentations as well as performing them led to new information and ideas from different parts, including colleagues, customers and stakeholders. The interviewees described learning things they most likely would not have learnt without experimenting something new. Through experiments they also got deeper contact with stakeholders such as customer's parents. Interviewee 14 describes below his relation to customers and relatives.

> "The working becomes more interesting and I have clearer targets [through experimenting]. I get better in contact with customer and find new aspects as I told.. With customer's relatives we talk in a different way when I tell that I've been planning of this kind of experiment – and then the relatives begin to tell the history of a customer.." [Interviewee 14]

In addition to experimenting making the actual core of the work clearer, in this field of work where employees work very close to customers it helped the employees, like interviewee 6, to understand and listen better their needs and become more customer-oriented.

> "Through that [an experiment] we learnt to listen more and be even more customer-oriented "[Interviewee 6]

> "Seems to me that my own prejudices are best repealed by just starting to do and act. Through that also abilities are found." [Interviewee 3]

Furthermore, according to interviewee 3, employees learnt to overcome prejudices through rapid experimenting and found hidden capabilities.

6.2.2.2 Process know-how

Factor called process know-how was recognised from the data. In this instance, process know-how means understanding of experimentation process, including the ability to ideate, plan and perform small experiments, the ability to reflect and learn from experiments and do iterations.

Seems that process know-how of an individual improves through the experience of experimentation. Interviewees who were more familiar with vocabulary and the process of experimentation and who had done at least one experiment during the experimentation challenge were likely to reflect experiments in a deeper level than those who were not that familiar with the process and vocabulary.

Those who had deeper understanding of experimenting process emphasised that one can learn from each experiment whether the actual goal set for the experiment is achieved or not, and those teachings are relatively important. As interviewee 12, some said the more the experiment fails, the more could be learned from it.

> "One always learns [from experiments]. It is kind of like the worse the experimentation is, the better one learns from it."[Interviewee 12]

> "Failure is also a result, it leads to something. You can improve or try once more." [Interviewee 3]

As interviewee 3 states, failure was rather seen as a result or learning point than totally failing. Those employees who had process know-how on experimenting were able to continue and learn better from each experiment, understand failures as learning objectives, process ideas and truly develop their work and challenge conventions. They reported feedback being an essential part of the work and developing, as it teaches what has to be done differently and what was successful. Interviewee 10 shows process know-how by stating the role of feedback, whether it is positive or negative.

> "Feedback is important in that essence so that one knows is it worth to continue to other experiments. So it [feedback] is always good, whether it was positive or negative, but it is always needed."[Interviewee 10]

Every interviewee reported discussion with colleagues being essential for reflection as well as receiving . Through discussion and feedback important information is exchanged and new aspects can be found and learnt. Yet, according to the study, receiving and listening to feedback requires humility and willingness to admit own faults and receive help from others.

Furthermore, essential part of process know-how is starting to perform with small experiments, prototyping with small group of customers, making a prototype as simple as possible and learning from the iterative process. Interviewees described being surprised by how fast a rough prototype can be done and how helpful it can be for work, compared to usual way of working meaning years of developing before some tool is launched for use.

> "This thing [a prototype], was welcomed so well, and actually it helped right away.. when usually these kind of tools are developed for many years before they are valid. So actually this kind of very simple system built this fast.. So it helped right away and that was a happy surprise.." [Interviewee 1]

Furthermore, a deeper perspective of process know-how affects bigger changes in an organisation. One interviewee described experimentation as a way to manage and change complex systems while smaller experiments can assist bigger changes to happen.

> "But it can be, that this kind of small experiment can help bigger changes to happen.. And I guess that's the trick in this whole thing and behind, that large things consist of several small ones and if those small ones can be fixed in several ways, it can have great impacts.." [Interviewee 1]

6.2.2.3 Resilience towards work

Even though in experimentation process an employee goes through negative emotions described earlier such as frustration, fear of failure or disappointment, experimenting helps to overcome those anxious feelings and improves resilience of an employee. Performing experiments forces employees to turn abstract ideas into concrete, smaller and lighter steps that are easier to approach, thus making the gap between planning and experimenting smaller.

When experimentation is experienced as important among participants or there is a real problem to be solved, employees may turn all the disappointment and frustration rising from previous experiments or abatement of the idea from colleagues or a leader into passion of performing better. This improves the capability of resilience, as interviewee 13 comments.

> "So first comes the frustration, but after that like next year we'll show them–. It may turn upside down when I get to process it in my head, like it's a bummer how badly this went, but it can be we will try it again in a bit different way and we will do it better then. This also encourages to continue.." [Interviewee 13]

Choosing the right terms may have a major impact on behaviour and resilience. Experiment as a word in a way consists of failing, and according to the study, compared to failing in daily routine work, failing in an experiment is experienced rather acceptable. This leads an employee feeling less pressure for succeeding with the first try. In addition, when the effort put on the first experiment is bearable, it is easier to persistently try another way. Interviewee 11 describes below his resistance.

> "Sometimes you really feel like giving up when you no longer come up with solutions how to make something work. But still you just.. You have a small break and then you get back to business." [Interviewee 11]

Even though during ideating and experimenting negative feelings are likely to occur, the characteristics, experience and know-how of experimenting helps to overcome these emotions and turn them to resilience. Iterative process of developing, dividing a task or a problem into smaller steps and learning by doing all support the emotional struggle with self-criticism, fear of failure, insecurity and uncertainty.

CLASS 1: FACTORS AFFECTING EXPERIMENTATION		
Category	**Subcategory**	**Example Quotation**
Role of the immediate superior	Leading by example	*"Our immediate superior is such a lovely person, real idea bank herself!*
	Supporting ideation and experimentation	*" It [feedback and appreciation from the upper level management] makes the experiment more viable, appropriate and bold."*
	Giving license to do experiments	*"Our leader will give space to that [experimenting] and actually even requires that we start experimenting and ideating."*
Role of the team	Democracy and low hierarchy	*"--if the majority [of employees] says we will do like this, then we will do like that."*
	Supportive climate and team practices	*"But then I realize that the more I say my ideas out loud, the more others also get excited and ideas keep coming."*
	Attitude towards failing	*We don't have here that kind of attitude that we would not be allowed to fail."*
	Team engagement	*"I think that the workplace has a major role [in experiments to happen], and especially that everyone are engaged. Thus we get things going and forward.."*
Structures and practices of developing	Resources allocated for ideation and development	*"Well there is not that much time to ideate during them [weekly meetings]."*
	Collecting of ideas	*But yep, if someone has experimented some good thing in his own project, it will be informed to others as well.*
	Implementing new ways of working	*"And then, if it requires actions and processing we agree on who will start to do it. So that it won't remain only in speech, as happens so often."*
Characteristics and know-how of an employee	Substance know-how	*"I used my previous experience as an instructor.. It was useful for this experiment.."*
	Tolerance for uncertainty, self-criticism and confidence	*"I would have probably thought about this idea for ages and be like 'this is not good enough yet and it's not perfect'"..*
	Attitude and motivation towards developing	*"I guess I find the certain people to whom I... [tell ideas out loud]. Then I dare to tell to others and as I have an urge to develop and learn, so through that I try.."*
The gap between an idea and experiment	Characteristics of an idea and experiment	*"But of course one has to think through that the experiment benefits everyone and it won't cause any harm to anyone."*
	Static friction	*"One really learns from that [experimenting and developing], definitely yes. One only needs to begin and get involved, which is usually the hardest part.."*
	Stakeholder distance and customer involvement	*"Especially when the idea rises from customer himself, we take every idea into account and consider everything that concerns a customer."*

Figure 6.1: Factors affecting experimentation in organisations, Class 1: Factors affecting experimentation behaviour of an individual

CLASS 2: HOW EXPERIMENTING AFFECTS AN INDIVIDUAL		
Category	**Subcategory**	**Example Quotation**
Emotional experience and engagement	Positive emotions: Happiness, excitement, inspiration, boost to self-esteem	*"Experimenting nourishes one's creativity and ability to throw oneself to something new."*
	Negative emotions: Frustration, disappointment, fear of failure and fatigue	*"When something fails, it does cause frustration every now and then."*
	Engagement and motivation towards work	*"It [positive feedback] makes me happy and motivates, and encourages further on"*
Learning	Reflection of work	*"And we get closer and deeper understanding of what our work is."*
	Process know-how	*"Failure is also a result, it leads to something. You can improve or try once more."*
	Resilience towards work	*"So first comes the frustration, but after that like 'next year we'll show them'"*

Figure 6.2: Factors affecting experimentation in organisations, Class 2: How experimenting affects an individual

7 Discussion and conclusions

This chapter concludes the findings of the thesis. Theoretical perspective is discussed and compared with the findings of the case study. Factors affecting experimentation behaviour are discussed in section 7.1. Then, relationship between learning and experimenting is discussed. Managerial implications describe guidelines for organisations based on the study, following the future research topics and discussion of reliability of the thesis.

A need for novel approaches for development that allows employees to improve their work in more iterative and creative ways that support learning exists. The aim of this thesis was to study experimentation-driven development as such an approach, shed the light on factors affecting experimentation behaviour and provide guidelines for organisations to support its employees in experimenting. Furthermore, Edmondson (1999) suggested, studies in real work teams are required, and this study aimed to add on this aspect studying factoring affecting experimentation behaviour in real work context.

Review of research objectives

The research questions set in the beginning of the thesis are presented below. They are reflected through the discussion.

1. What kinds of factors affect on experimenting behaviour of an employee?
2. How experimenting affects an individual?
3. How can experimenting behaviour be supported in organisations?
4. How can experimentation support organisational learning?

7.1 Factors affecting experimentation behaviour

From the data rose various factors affecting experimentation behaviour, and the literature review revealed how similar factors are related to organisation's ability to innovate and employee's creativity. Studies show creativity has enhancing impact on business profit and growth (Nyström, 1990) According to

Vincent et al. (2002) creative work consists of creative and innovation processes, and as experimenting stands as significant part of innovation process, similar factors that foster innovation are likely to foster experimenting. In this section most interesting findings from the data are discussed.

Creativity and innovation in an organisation require integrated organisational approach, right climate, appropriate incentives for innovators, and a systematic way and resources to transform an idea into an innovation. (Roffe, 1999) Experimentation-driven approach enables a systematic way to foster creativity and development.

Role of the immediate superior

Interviewees described vividly how essential role their leaders and immediate superior have on their willingness to conduct experiments. First of all, leaders acting as role models was considered essential. Example of the leaders was also recognised from literature review as Garvin et al. (2008) emphasise how through own example leaders can encourage employees to offer new ideas and options.

Secondly, interviewees described how leaders should support ideation and experimentation by providing feedback and encouraging employees to try out novel approaches and utilise their professionalism. According to (Redmond et al., 1993) leaders should encourage employees to find alternative solutions, approach problems from different perspectives and overall support several alternative problem-solving strategies in order to enhance the creativity and experimentation behaviour of employees.

Leadership has a great role in ensuring that the climate and culture, structure and practises of work and work environment together with human resource practices are supportive for creative endeavours to occur (Shalley and Gilson, 2004; Oldham and Cummings, 1996; Mumford et al., 2002). Furthermore, speaking out loud ideas or making mistakes should not result in punishment or humiliation, and leaders should act in supporting and coach-oriented manner (Edmondson, 1999). According to Sosik et al. (1999) leaders should find ways to inspire employees.

Thirdly, license to conduct experiments was considered important among interviewees. Some interviewees described their immediate superiors even requesting for novel approaches, which was considered fair and encouraging, as it showed support for experimenting. According to Barczak and Wilemon (1989) leader's task is to provide clear focus for the work of employees. In addition, they can even request creative and innovative solutions form the team, which may lead to better results in creativity of individuals (Amabile et al., 2002). Thus, seems that requesting to conduct experiments supports

clear focus of the work and is likely to encourage employees.

However, leaders need to stay consistent when requesting for novel approaches and allocating resources for them. It was clear from the empirical data how little time is allocated for developing, and according to Lee et al. (2004) when affecting and changing only one organisational factor, organisation management need to be alert for occurring inconsistencies that may result to decrease in willingness to engage to experimental behaviour (Lee et al., 2004). Through the green light given and their own example leaders can change the focus from success and failure into thinking in terms of learning and experience (Farson and Keyes, 2002).

Even though almost every of 14 interviewed person described how the immediate superior they had have succeeded in establishing a climate where experimenting is possible to happen, all units did not perform experiments during the experimentation challenge. Thus leadership behaviour alone is not sufficient for experimentation behaviour in organisations.

Role of the team

Interviewees described four main characteristics belonging to the role of the team. First of all, team should base its decisions and actions on low hierarchy and democracy. Secondly, supportive climate and team practices refers tightly to the concept of psychological safety; an atmosphere where employees feel safe to tell their ideas out loud, where they get support for the ideas and experiments. According to Amabile et al. (1996) team can support and improve individuals' ability and willingness to aim for creative actions.

Thirdly, attitude towards failing is an essential factor for interviewees when considering willingness to conduct experiments. Interviewees described experimenting being more likely when the whole team shares the perspective of failing being allowed. Talking about failures and accepting them as part of developing was in most positive units towards experimenting considered useful. Safe environment does not humiliate or punish employees for failing or coming up with novel ideas or doubts. (Garvin et al., 2008; De Dreu and West, 2001; Amabile and Khaire, 2008; Amabile et al., 1996) Also according to Edmondson (1996) employees are less hesitant to discuss mistakes when normative values of the organisation and work group assure failures being allowed and even expected part of developing and learning. In addition, Garvin et al. (2008) argues when knowing that well-intentioned interpersonal risks are not punished is a shared belief of a team, team members are more likely to take proactive actions essential for experimenting. Failure can disclose important information and reveal gaps in knowledge, and is thus important in as early phase of the development process as possible. (Buijs, 2007; Thomke,

2001) Many interviewees, indeed, described failure being essential part of experimenting and developing.

Lastly, overall team engagement affects positively on the willingness to conduct experiments and is essential for experimenting: interviewees described how experiments and ideas are more likely tail off or be rejected when the whole team is not involved and engaged to the experiment. Also according to Agrell and Gustafson (1994) including team members in ideation assists in idea implementation and through participation new ideas are not that likely to be rejected or abandoned.

Structures and practices of developing

According to empirical data, interviewees described lacking the time to develop their work, discuss about ideas and generate them, not to mention actual experimenting. This implicates the structure of the work and time allocated for developing, whether through conventional planning-based or experimentation-driven approach, is not sufficient.

Thomke (2001) emphasises an organisation should allow and manage the work for the employees so that fast experimentation is possible. This usually requires challenging routine ways of working and shaping the routines, yet fast experimenting is essential in order to get rapid feedback for shaping the ideas.

According to Amabile et al. (2002) clear time should be allocated for developing especially when the aim is to flourish idea generation, creativity, learning and experimentation of new concepts. Redmond et al. (1993) state that leaders should allow enough time for problem solving and creative actions, and according to Amabile and Gryskiewicz (1987) also playing with ideas and exploring multiple perspectives.

Characteristics and know-how of an employee

Substance know-how and expertise of an employee rose from the empirical data as essential for experimenting. Importance of various types of people in a team was considered important. For instance, few interviewees described how interns or students are warmly welcome to the workplace as they have fresh opinions and they can observe the workplace from novel perspectives. However, some interviewees claimed how only through gained experience they felt courageous enough to suggest novel approaches. According to the literature review, homogeneity in teams easily leads to groupthink, routine work and repeating traditional daily practices, while even one or two different individuals can stimulate the innovativeness of a team (Sternberg et al.,

1997). This perspective supports the findings in empirical data. According to Sternberg et al. (1997) the outcasts and those who stand out from the group are required in order to think outside the box, challenge the status quo and present alternative solutions and ideas that would be missing without the participations of these individuals. The outcasts can be considered as interns or students mentioned in interviews.

In the empirical data insight of unwillingness to change was recognised, as interviewees described recognising resistance to change and novel ideas. However, some interviewees described professional expertise and experience assisting in bringing out opinions, being confident enough to conduct experiments and being able to get others along. Thus, according to the study previous experience can encourage performing experiments and improve believing in one's ideas, yet it can also lead to routine hard to change after many years. Meaning of prior knowledge and experience of an employee of area of work before demanding or anticipating creative actions from them is related to creativity (Mumford and Gustafson, 1988; Redmond et al., 1993; Shalley and Gilson, 2004). According to Mumford and Gustafson (1988) and Redmond et al. (1993) without previous experience of the job routine and substance knowledge and expertise on the field creative endeavours are more rare. Also Jung et al. (2003) argues for technical knowledge of an individual for fostering creativity.

Also according to Kolb et al. (1984) all learning situations should take into account people arriving from all different experiential backgrounds to what they build their new experiences and knowledge on. This partly explains resistance to new ideas, as when new information and experiences are in contradiction to old beliefs and experiences, new ideas and information is more difficult to adapt. In the education process learner's old beliefs and theories should be brought out, examined and tested, following integration of the new models and refined ideas into learner's belief systems. Experimentation seems to assist in this process, as feedback from them should be instant.

Furthermore, employee's attitude towards experimenting seems to depend on employee's attitude, motivation and engagement towards work rather than only on work experience and prior knowledge. Together with the attitude and motivation towards developing, individual tolerance for uncertainty, self-criticism and confidence affect on his willingness to conduct experiments. Few interviews recognised experimenting assisting in lowering the threshold for acting, while usually being perfectionistic and fearing failures. This resonates with Mumford et al. (2002) who claim that level of uncertainty can be reduced for instance through goal-setting and fast prototyping. Furthermore, experiments are allowed to fail and they are encouraged to be designed as

low-risky as possible.

The gap between an idea an experiment

Characteristic of an idea and experiment have effects on whether the idea is evolved into an experiment. Interviewees for instance described planning experiments so large, that when actual time to conduct the experiment and leave the ideation mode, experiment was left undone. Employees did not want to take additional responsibility while fearing it would take too much time or did not consider the experiment important enough.

Static friction refers to a moment when the attitude towards developing, experimenting and ideating is positive, but when time for action, nothing happens. This could be called as the paradox of getting of light. Employees are not eager to develop things that are supposed to help their workload and form a more efficient routine. So instead they stick to the same routines, that actually consume good amount of their energy.

Interviewees described situation that was lacking static friction as smooth and clear, when sufficient resources were available right away, experiment was light enough to conduct with ease, necessary people were engaged to experiment and thus time from idea to actual experiment and reflection was short. However, this is rarely the case when considering hectic working environments with changing situations and no allocated time for developing. Thus, when resources are effectively used and participants engaged, experimenting happens by itself like in the situation described above.

Setting a clear goal for an experiment makes measuring and evaluating the experiment easier. Interviewees described usually having an eligible result for an experiment, and if that result is achieved, the experiment is considered successful. Goal assists in learning of experiment and further developing, and the experimentation overall occurring. Furthermore, team members were more likely to be engaged when sharing a transparent goal. According to Thomke (2001) the whole team understanding the meaning of experimenting and developing forms a basis for team engagement. In addition, clear purpose for the team in order it to function and exist was supported in literature review (Katzenbach, 1993).

Additionally, team members have supplementary knowledge and abilities compared to each other, and they share a goal, targets and ways of working and approach (Edmondson, 1999). According to Katzenbach (1993) great team performance consists of continuous work of shaping a common purpose, agreeing on performance goals, defining a common working approach, developing high level complementary skills and being transparent on the results. He emphasises that through disciplined actions groups transform to teams

and argues how demanding schedules, long-standing habits and unwarranted assumptions tend to threaten team efficiency and performance. Even though these aspects were not all straight recognised from the empirical data, many parts of it were, and further studies should be done in order to study the affects experimenting has on team level.

Some interviewees described being able to ideate and conduct experiments freely, getting support and being encouraged by the leader and the team. However, few interviewees described being important to design experiments as safe and harmless for participants, and that experiments always need to be designed considering customers and their safety. Also (Farson and Keyes, 2002) point out how issues about safety and health of people participating experiments should not be overruled by the insights gained from an experiment.

In addition, empirical data revealed how ideas emerging from customers and when experiments conducted in close distance to customer and stakeholder interface, best learnings were gained. According to Thomke (2003) experiments concerning service development remain most useful when conducted in real life circumstances, as the feedback is instant and customer transactions real. Also Quinn (1985) emphasise engaging lead customers in the interactive development process in order to elucidate more relevant information about customer's demands.

Emotional experience and engagement

Experience of experimenting consists of both positive and negative emotions resulting from the process of experimentation as well as engagement and motivation towards work. Interviewees described how successful experiments, ideation and planning conducting experiments brought them happiness, excitement, inspiration and boost to self-esteem. Interviewees also described experimenting nourishing one's creativity and ability to throw oneself to try novel approaches.

In turn, failing is likely to cause frustration and disappointment which can also result from disengagement of all team members. Interviewees told failing does not feel good, and sometimes it is frustrating. Yet oftentimes failing is not considered too serious and after some time only gives boost to try again, with better knowledge. Failing as a personal matter remains a difficult subject, as failing never feels exceptionally great, and often employees still consider failed work as failing personally (Farson and Keyes, 2002).

Interviewees described how experimenting assisted in braking the routines and challenging conventional ways of working. Dewey (1956) separates learning from the conventional way for humans to behave and follow the

routines.

Interviewees also described feeling even tired when their idea did not succeed in an experiment, did not go through or team members were not engaged. Through literature review straight correlations to fatigue was not found, yet correlations between lack of time for development and willingness to conduct experiments were found. Employees should be empowered through motivating their intrinsic motivation and allowing them autonomously conduct experiments and learn from them. (Amabile, 1998; Jung, 2001)

According to Quinn (1985), fast multiple-idea prototyping leads to more innovative outcomes, offers essential information about ideas or product's quality, motivates employees, and helps the company and the team to cope with anxiety and uncertainty in development. Thus, fast prototyping serves an essential way for learning from the iterative process. Market analysis, however, remain valuable when dealing with familiar products, yet with radical innovations they may easily offer misleading information. (Quinn, 1985)

Learning

Empirical data brought to discussion learning aspects of experimenting through reflection of work, process know-how of experimenting and grown resilience towards work. This learning aspect of experimenting is further discussed in next section.

However, seems that acquiring a first experience of experimentation narrows the gap between an idea and actually performing an experiment. As according to the literature, familiarity of a subject is likely to assist in adopting novel methods, an implication could be drawn how making the first experiment an essential part for the longer-term experimentation approach. The interviewees described realising only after the first experiment that it actually brought energy and resources and not only deprived them. Thus, the sooner the first experiment is executed after the idea has rose, the better it seems to be for the whole developing process.

7.2 The relation between learning and experimentation

In this thesis, learning is considered as a process of continuous trial and error (Argyris and Schon, 1978; Edmondson, 1999) that includes individual growth and improved performance. According to the experimentation process of Thomke (1998), learning glues together all the four phases of the process.

Setting a hypothesis, planning an experiment, executing it and analysing the results are all reflected throughout the process in order to learn about the fundamental idea and develop it further. In addition, according to the Execution Innovation Model, novelties are only generated through a learning process of iterative experimentation. (Tuulenmäki and Välikangas, 2011)

According to the data on experience of experimentation, interviewees described how experimenting assists in learning about problem at hand, and provides information whether trial is malfunctioning. In addition, interviewees described that experimenting stands as an excellent method for learning, major factors being both the amount of experimentations conducted and the reflection on them. Empirical data with literature review thus supports the perspective that experimenting can serve as a method for learning.

Through experimenting interviewees described gaining insights on their own work, on experimentation process and on team and individual behaviour. This however required communication and discussion among colleagues, shared trust and engagement towards experiments and positive attitude towards failure. In the theory of Edmondson (1999) on team learning, factors essential for learning are similar to essential factors for experimenting. These include transparent information sharing, asking for help, receiving and giving feedback, tolerating failures and discussing about them in order to reflect experiments and improve work.

Few interviewees described using experimentation-driven approach in their daily life and that through the experimentation challenge 'experimentation' is a new word in their vocabulary while few told realising through the experimentation challenge that their work is actually about trying out new ways of doing things and finding the best way to help customers in their daily lives.Thus, through experimenting interviewees gained deeper understanding of their work and it assisted in reflection of work.

In the planning-oriented developing process learning is likely to happen when the product or service is launched or a first, large-scale pilot is tested. Thus, the results of this study support the statement how experimenting could be used as a tool for learning about development idea with lower resources. As failure is very likely outcome of experimentation, every experiment are opportunities for growth and learning.

According to Buijs (2007), valuation points stand for usable tool for measuring the quality of idea but gives also understanding of how the evaluation process is going. In addition, while evaluating, team members also need to reflect the process and the idea, through which learning occurs.

Also (Runco, 1994) emphasises how only after evaluation of ideas implementation can be discussed and performed and several studies show the essence of evaluation (Mumford et al., 2002; Vincent et al., 2002). Useful

questions in evaluation process could be "What went well?", "What can be improved?" and "What has been learned?" (Buijs, 2007). These were factors revealing also from empirical data, supporting the relationship between learning and evaluation of experiments.

The essence of learning from experiments is to figure out what works and what does not in an experiment or idea. Thus, experiments should be designed and planned keeping in mind how to maximise the amount of learning and valuable insights, not focus on wrong details and successful experiment. Through defining accurate measures one can actually know whether the experimentation was useful and essential was learned or not (Thomke, 2003).

In group level, learning is enabled through testing assumptions and discussion of opinion differences transparently in order to improve team performance. (Edmondson, 1999)

According to the data experimenting allows to test assumptions together with a team providing a transparent tool to learn together. This resonates with Edmondson (1999), who argues how through testing assumptions and discussion of opinions transparently learning is enabled.

Accordingly, in management literature learning is considered relating and even being dependent on receiving feedback (Schön, 1983), discussion and failure (Sitkin, 1992) and experimenting (Henderson and Clark, 1990). As relevant information about performance is acquired through errors, discussion about them has been related with organisational effectiveness (Sitkin, 1992). According to Huy and Mintzberg (2003) organisations learn best through small experiments and trying out new things, and the closer and more related experimentations are to customers and customer interfaces, the more can be learned.

Setting frames to experimentation is important; defining when the experimentation begins and when is a moment for closure. In many reported experiments experimenting has been understood as fast prototyping but no reflection. These leave a person easily with an unfinished feeling that is too easily related to failure.

7.3 Practical implications

This thesis brought novel perspective on organisational learning and development by combining and presenting an approach for fostering creativity and innovation of employees in an organisation through experimentation-driven process.

Experimentation-driven development has not yet been widely studied, thus this thesis provided important theoretical data and insights on exper-

imentation process as well as sheds the light on the important issue of employee engagement and learning in order to create new value and competitive advantage in organisations. Furthermore, insights were gained on the emotional experience of experimenting.

This thesis provided perspective through which experimenting can be considered as a tool to foster learning of employees. Requirements for organisational environment in which employee's are willing to conduct experiments were outlined.

This section assembles the findings of the study to set of guidelines of factors organisation should consider in order to support experimentation.

Safe and supporting environment

In the heart of every change and development project are employees, the group of individuals who are touched by the change. In order to proceed to meaningful and efficient changes for both the company and its employees, individuals has to be onboard.

In the very heart of willingness to conduct experiments seems to be individuals sense of safe and supporting environment towards creativity, idea generation and experimentation. This includes team engagement, positive attitude towards failing, environment tolerating uncertainty and fostering risk-taking. Furthermore, brainstorming and saying out loud problems and ideas should be encouraged.

Support from leaders

Leaders should show their support towards experimenting by acting as role-models, encouraging employees to work on their own expertise and interests, reward from successful experiments and ideas and showing support by taking results of experiments to upper management. When providing sufficient level of autonomy to employees, leaders are likely to encourage their employee's intrinsic motivation leading to more satisfied, efficient and creative employees.

Allocating resources

Allocating resources refers to established truth that developing one's work requires time, as well as creative process. Experimentations themselves should be designed to consume little resources, yet reasonable amount of resources should be reserved for executing experiments. Professional conversations among colleagues, visiting peer units and meeting peer colleagues in the

country are likely to foster the expertise, creativity and willingness to develop one's work. No time for idea generation or experimenting is likely to decrease willingness to conduct develop one's job and will be considered as extra. Thus, time for develop one's work is necessary.

Careful experimentation design

Experimentation design consists of planning experiments carefully, defining the learning goal of each experiment and how it will be evaluated. Furthermore, identifying the schedule for experiment and appointing a responsible person for the experiment. In addition, transparent communication and documentation of ideas and the results of experiments are all equally essential for successful experiments.

Setting a clear goal for an experiment makes measuring and evaluating the experiment easier. Interviewees described usually having an eligible result for an experiment, and if that result is achieved, the experiment is considered successful. Goal assists in learning of experiment and further developing.

Careful experimentation design considers individual characteristics and experience of employees conducting experiments. Experiments should be designed to not consume steep amount of resources of an employee. Experiments should be easy to approach, conduct and even bring resources and energy instead of consuming them. In addition, experimentations should be designed by the employees themselves as they are experts of their own work. When working in close context of customer interface, customer insights and ideas could be considered for experimenting when possible.

Furthermore, as developing requires adapting novel ways of working and challenging status quo, great experimentation design considers the implementation process of successful ideas and results of experiments. Implementation is a key issue when adapting experimentation-driven approach, and organisational and work structures need to support implementation of experimentations.

7.4 Reliability of the thesis

In order to assess the reliability of the thesis, approach of Lincoln and Guba (1985) on reliability is used. According to this approach, reliability is assessed through trustworthiness, which consists of four aspects: credibility, transferability, dependability and confirmability.

Credibility means that the interpretations made of the original data maintain credible (Lincoln and Guba, 1985) (page 301-316). In this thesis conclu-

sions are drawn after describing the data collection carefully, so the reader is able to follow the process of interpretations, and by using direct quotations the data behind interpretations is revealed for the reader. In addition, discussions with co-researchers and professors about the interpretations have aimed to maintain credibility. However, interviews were conducted good time after experimentation challenge was over. Few interviews described being difficult to recall the feelings and experiments back when conducting experiments then in detail. Thus, better and more credible data would be gained to have interviewed employees right after the experimentation challenge, while experiments are actively in mind. In this study this was not possible due to the holiday season employees had right after the experimentation challenge.

Transferability refers to possibilities to transfer the results and findings to another context (Lincoln and Guba, 1985) (page 316). In the thesis experimentation-driven process was presented and brought to organisational context in a case study. The study revealed several factors in organisational level which can be affected in order to foster experimentation behaviour from individual, team, management and organisational structures perspective. Even though the case study was conducted in specific field, the themes and environmental factors together with managerial implications are transferable to other organisations, as they can be considered as guidelines for good practices and development.

Dependability refers to the consistency of the research process (Lincoln and Guba, 1985) (page 316-327). Throughout the thesis the research design and process is described clearly. The research questions are presented in the beginning of the thesis and further revisited in the conclusions, and the results are evaluated through the research questions.

Confirmability refers to objectivity and neutrality of the thesis (Lincoln and Guba, 1985) (page 316-327). The writer of the thesis has never been working on studied industry field and was not involved in the empirical case other than in a role of interviewer and observer. In the data analysis process other researchers were involved and the results were discussed among three researchers. The interviews were recorded and transcribed. The theoretical part formed a broad review on factors affecting experimentation, building on the theories from organisational management, organisational learning, development and innovation as well as creativity and leadership.

7.5 Future work

This study focused on identifying factors affecting experimentation behaviour and creating guidelines for organisations to support experimenting. Addi-

tionally, interesting findings from the data consisted of affects experimenting has on individual. Experimenting is highly different experience for an individual than planning-based development. Further study of the experience of experimenting should be done in order to form deeper understanding on how to support experimentation in organisational context. Accordingly, as Edmondson (1999) argues, psychological safety as a means to promote team performance is increasingly relevant both in future work and research.

This thesis was made in a case company of specific field of service business, where communication with customers is constant; employees being daily in tight contact with customers, the gap between an idea and conducting experiments, receiving feedback and learning from them can be lower than in other fields of business. This especially, when the aim is to learn of customer needs and ways to serve them better. This is not necessarily an obstacle, as every work life has their own challenges and demands for development. Experiments can be conducted regardless of the business field, the art of experimenting being the ability to design low-cost and low-resource experiments that teach about the fundamental idea or assumption. Future research topic could be to study the experimentation design and how to design experiments that can be best learned from and suit best the occasion.

Considering the complex character of organisational change, learning and behaviour affected by various factors in individual, organisational and team levels, comprehensive literature review was gathered. It combined literature on various fields of research aiming to form holistic picture of factors affecting experimentation in changing business environment. However, more focused research should be conducted on various topics in order to gain proof on the relations and factors found in this study.

In this thesis guidelines for organisations to support experimenting was provided, yet further studies are required in order to learn more about the factors and about transferring an experimentation-driven culture in organisations.

Experimentation challenge was a method MIND team invented in order to study experimentation behaviour in organisations. Interviewees described challenge being encouraging and positive way to put thoughts on improving work. Interesting future research would be to study further experimentation-challenge as a way to implement experimenting to organisations way of developing. For instance, few interviewees hoped experimentation challenge to became an annual tradition, which could support the adaptation of new way of working, learning and reflecting one's work. However, these are hypothesis too early to confirm without further research.

References

Agrell, A. and Gustafson, R. (1994). The Team Climate Inventory (TCI) and group innovation: A psychometric test on a Swedish sample of work groups. In: *Journal of Occupational and Organizational Psychology* 67.2, pp. 143–151.

Alderfer, C. P. (1983). *An intergroup perspective on group dynamics.* Tech. rep. DTIC Document.

Amabile, T. and Gryskiewicz, S. S. (1987). *Creativity in the R&D laboratory.* Center for Creative Leadership.

Amabile, T. M. (1998). *How to kill creativity.* Harvard Business School Publishing.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., and Herron, M. (1996). Assessing the work environment for creativity. In: *Academy of management journal* 39.5, pp. 1154–1184.

Amabile, T. M., Hadley, C. N., and Kramer, S. J. (2002). Creativity under the gun. In: *Harvard business review* 80.8, pp. 52–61.

Amabile, T. M., Schatzel, E. A., Moneta, G. B., and Kramer, S. J. (2004). Leader behaviors and the work environment for creativity: Perceived leader support. In: *The Leadership Quarterly* 15.1, pp. 5–32.

Amabile, T. and Khaire, M (2008). Creativity and the role ofthe leader. In: *Harvard Business Review.*

Ancona, D. G. and Caldwell, D. F. (1992). Demography and design: Predictors of new product team performance. In: *Organization science* 3.3, pp. 321–341.

Anderson, E. T. (2011). A Step-by-step guide to smart business experiments. In: *Development and Learning in Organizations* 25.6.

Andrews, F. and Gordon, G (1970). Social and organizational factors affecting innovation research. In: *Proceedings for the American Psychological Association* 78, pp. 570–589.

Andriopoulos, C. and Lowe, A. (2000). Enhancing organisational creativity: the process of perpetual challenging. In: *Management Decision* 38.10, pp. 734–742.

Argote, L. and Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. In: *Organizational behavior and human decision processes* 82.1, pp. 150–169.

Argyris, C. (1982). *Reasoning, learning, and action: Individual and organizational.* Jossey-Bass San Francisco.

Argyris, C. (1993). *Knowledge for action: A guide to overcoming barriers to organizational change.* ERIC.

Argyris, C. (1994). Good communication that blocks learning. In: *Harvard Business Review* 72.4, pp. 77–85.

Argyris, C. and Schon, D. (1978). Organizational learning: A theory of action approach. In: *Reading, MA: Addision Wesley*.

Ashford, S. J. and Northcraft, G. B. (1992). Conveying more (or less) than we realize: The role of impression-management in feedback-seeking. In: *Organizational Behavior and Human Decision Processes* 53.3, pp. 310–334.

Ashford, S. J., Rothbard, N. P., Piderit, S. K., and Dutton, J. E. (1998). Out on a limb: The role of context and impression management in selling gender-equity issues. In: *Administrative Science Quarterly*, pp. 23–57.

Avolio, B. J. and Bass, B. M. (1988). Transformational leadership, charisma, and beyond. In:

Barczak, G. and Wilemon, D. (1989). Leadership differences in new product development teams. In: *Journal of Product Innovation Management* 6.4, pp. 259–267.

Baron, J. (2000). *Thinking and deciding*. Cambridge University Press.

Bass, B. M. and Avolio, B. J. (1997). *Full range leadership development: Manual for the Multifactor Leadership Questionnaire*. Mind Garden Palo Alto, CA.

Bass, B. M., Avolio, B. J., and Pointon, J (1990). *The implications of transactional and transformational leadership for individual, team, and organizational development*.

Bazerman, M. and Moore, D. A. (2012). Judgment in managerial decision making. In:

Bhattacherjee, A. (2012). Social science research: principles, methods, and practices. In:

Blomkvist, J. (2011). Conceptualising Prototypes in Service Design. In:

Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. In: *Qualitative research in psychology* 3.2, pp. 77–101.

Brown, R. (1990). Politeness theory: Exemplar and exemplary. In: *The legacy of Solomon Asch: Essays in cognition and social psychology*, pp. 23–38.

Budner, S. (1962). Intolerance of ambiguity as a personality variable. In: *Journal of personality*.

Buijs, J. (2007). Innovation leaders should be controlled schizophrenics. In: *Creativity and innovation management* 16.2, pp. 203–210.

Burns, T. E. and Stalker, G. M. (1961). The management of innovation. In: *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

Ciborra, C. U. (1996). The platform organization: Recombining strategies, structures, and surprises. In: *Organization science* 7.2, pp. 103–118.

Csikszentmihalyi, M. (1999). 16 Implications of a Systems Perspective for the Study of Creativity. In: *Handbook of creativity*, p. 313.

Davenport, T. H. (2009). How to design smart business experiments. In: *Harvard Business Review* 87.2, pp. 68–76.

De Dreu, C. K. and West, M. A. (2001). Minority dissent and team innovation: the importance of participation in decision making. In: *Journal of applied Psychology* 86.6, p. 1191.

Deci, E. L. and Ryan, R. M. Intrinsic motivation and self-determination in human behavior, 1985.

Dess, G. G. and Picken, J. C. (2001). Changing roles: Leadership in the 21st century. In: *Organizational Dynamics* 28.3, pp. 18–34.

Dewey, J. (1956). *Human nature and conduct*. Safi Ali Shah.

Dougherty, D. and Hardy, C. (1996). Sustained product innovation in large, mature organizations: Overcoming innovation-to-organization problems. In: *Academy of Management Journal* 39.5, pp. 1120–1153.

Dubois, A. and Araujo, L. (2004). Research methods in industrial marketing studies. In:

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. In: *Administrative science quarterly* 44.2, pp. 350–383.

Edmondson, A. C. (1996). Learning from mistakes is easier said than done: Group and organizational influences on the detection and correction of human error. In: *The Journal of Applied Behavioral Science* 32.1, pp. 5–28.

Edmondson, A. C. (2003). Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. In: *Journal of management studies* 40.6, pp. 1419–1452.

Eisenhardt, K. M. (1989). Building theories from case study research. In: *Academy of management review* 14.4, pp. 532–550.

Farson, R. and Keyes, R. (2002). The failure-tolerant leader. In: *Harvard business review* 80.8, pp. 64–71.

Ford, C. M. (1996). A theory of individual creative action in multiple social domains. In: *Academy of Management review* 21.4, pp. 1112–1142.

Gardner, H. (1988). Creativity: An interdisciplinary perspective. In: *Creativity Research Journal* 1.1, pp. 8–26.

Garvin, D. A., Edmondson, A. C., and Gino, F. (2008). Is yours a learning organization? In: *Harvard business review* 86.3, p. 109.

Getzels, J. W. and Csikszentmihalyi, M. (1975). From problem solving to problem finding. In: *Perspectives in creativity* 90, p. 116.

Geus, A. d. (1997). The living company: growth, learning and longevity in business. In: *London: Nicholas Brealey*.

Golembiewski, R. T. and McConkie, M. (1975). The centrality of interpersonal trust in group processes. In: *Theories of group processes* 131, p. 185.
Guilford, J. (1967). Creativity: Yesterday, today and tomorrow. In: *The Journal of Creative Behavior* 1.1, pp. 3–14.
Hackman, J. R. (1987). The design of work teams. In: *Ariel* 129, pp. 32–197.
Hammer, M. and Champy, J. (1993). Reengineering the corporation: A manifesto for business revolution. In: *Business horizons* 36.5, pp. 90–91.
Henderson, R. M. and Clark, K. B. (1990). Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. In: *Administrative science quarterly*, pp. 9–30.
Hennessey, B. A. and Amabile, T. M. (1988). 1 The conditions of creativity. In: *The nature of creativity: Contemporary psychological perspectives*, p. 11.
Hollander, E. P. (1978). Leadership dynamics. In: *New York*.
House, R. J. (1971). A path goal theory of leader effectiveness. In: *Administrative science quarterly*, pp. 321–339.
Hsieh, T. (2010). *Delivering happiness: A path to profits, passion, and purpose*. Hachette Digital, Inc.
Huy, Q. N. and Mintzberg, H. (2003). The rhythm of change. In: *MIT Sloan Management Review* 44.4, pp. 79–84.
Isaksen, S. G. (1983). Toward a Model for the Facilitation of Creative Problem Solving*. In: *The Journal of Creative Behavior* 17.1, pp. 18–31.
Janis, I. L. (1982). Groupthink: Psychological studies of policy decisions and fiascoes. In:
Jung, C. G. (1923). Psychological types. In: *New York*.
Jung, D. I. (2001). Transformational and transactional leadership and their effects on creativity in groups. In: *Creativity Research Journal* 13.2, pp. 185–195.
Jung, D. I., Chow, C., and Wu, A. (2003). The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings. In: *The Leadership Quarterly* 14.4, pp. 525–544.
Kanter, R. M. (1983). The Change Masters: Innovation and Productivity in American Corporations. In: *New York*.
Kanter, R. M. (1984). *Change masters*. Simon and Schuster.
Kasof, J. (1997). Creativity and breadth of attention. In: *Creativity Research Journal* 10.4, pp. 303–315.
Katz, D. and Kahn, R. L. (1978). The social psychology of organizations. In:
Katz, R. and Allen, T. J. (1985). Project performance and the locus of influence in the R&D matrix. In: *Academy of Management Journal* 28.1, pp. 67–87.

Katzenbach, J. R. (1993). *The wisdom of teams: Creating the high-performance organization*. Harvard Business Press.

Kehitysvammaisten palvelusäätiö. `http://www.kvps.fi/`, referred December 10th, 2014.

Kim, W. C. and Mauborgne, R. (2014). Blue Ocean Leadership. In: *Harvard Business Review* 4, p. 23.

Kolb, D. A. et al. (1984). *Experiential learning: Experience as the source of learning and development*. Vol. 1. Prentice-Hall Englewood Cliffs, NJ.

Kramer, R. M. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. In: *Annual review of psychology* 50.1, pp. 569–598.

KVPS Tukena Oy. `http://www.tukena.fi/`, referred December 10th, 2014.

Lee, F. (1997). When the going gets tough, do the tough ask for help? Help seeking and power motivation in organizations. In: *Organizational behavior and human decision processes* 72.3, pp. 336–363.

Lee, F., Edmondson, A. C., Thomke, S., and Worline, M. (2004). The mixed effects of inconsistency on experimentation in organizations. In: *Organization Science* 15.3, pp. 310–326.

Levitt, B. and March, J. G. (1988). Organizational learning. In: *Annual review of sociology*, pp. 319–340.

Lincoln, Y. and Guba, E. (1985). Naturalistic inquiry (Vol. 75). In: *Beverly Hills: Sage Publications*.

Lingo, E. L. and O'Mahony, S. (2010). Nexus work: Brokerage on creative projects. In: *Administrative Science Quarterly* 55.1, pp. 47–81.

March, J. G. (1991). Exploration and exploitation in organizational learning. In: *Organization science* 2.1, pp. 71–87.

McGourty, J., Tarshis, L. A., and Dominick, P. (1996). Managing innovation: lessons from world class organizations. In: *International journal of technology management= Journal international de la gestion technologique*.

McGrath, R. G. (2010). Business models: a discovery driven approach. In: *Long range planning* 43.2, pp. 247–261.

Monge, P. R., Cozzens, M. D., and Contractor, N. S. (1992). Communication and motivational predictors of the dynamics of organizational innovation. In: *Organization Science* 3.2, pp. 250–274.

Monroe, M. C. (2001). Evaluation's Friendly Voice: The Structured Open-Ended Interview. In: *Applied Environmental Education and Communication* 13, p. 18.

Morgan, G. and Smircich, L. (1980). The case for qualitative research. In: *Academy of management review* 5.4, pp. 491–500.

Morrison, E. W. (1993). Newcomer information seeking: Exploring types, modes, sources, and outcomes. In: *Academy of Management Journal* 36.3, pp. 557–589.

Mumford, M. D. (2002). Social innovation: ten cases from Benjamin Franklin. In: *Creativity research journal* 14.2, pp. 253–266.

Mumford, M. D. and Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. In: *Psychological bulletin* 103.1, p. 27.

Mumford, M. D., Scott, G. M., Gaddis, B., and Strange, J. M. (2002). Leading creative people: Orchestrating expertise and relationships. In: *The Leadership Quarterly* 13.6, pp. 705–750.

Nyström, H. (1990). Organizational innovation. In:

Oldham, G. R. and Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. In: *Academy of management journal* 39.3, pp. 607–634.

Quinn, J. B. (1985). Managing innovation: controlled chaos. In: *Harvard business review* 63.3, pp. 73–84.

Redmond, M. R., Mumford, M. D., and Teach, R. (1993). Putting creativity to work: Effects of leader behavior on subordinate creativity. In: *Organizational behavior and human decision processes* 55.1, pp. 120–151.

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Random House LLC.

Robinson, A. G., Stern, S., and Stern, S. (1997). *Corporate creativity: How innovation and improvement actually happen*. Berrett-Koehler Publishers San Francisco.

Roffe, I. (1999). Innovation and creativity in organisations: a review of the implications for training and development. In: *Journal of European Industrial Training* 23.4/5, pp. 224–241.

Runco, M. A. (1994). *Problem finding, problem solving, and creativity*. Greenwood Publishing Group.

Runco, M. A. and Okuda, S. M. (1988). Problem discovery, divergent thinking, and the creative process. In: *Journal of Youth and Adolescence* 17.3, pp. 211–220.

Runco, M. A. and Vega, L. (1990). Evaluating the creativity of children's ideas. In: *Journal of Social Behavior & Personality*.

Salancik, G. R. and Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. In: *Administrative science quarterly*, pp. 224–253.

Sanna, L. J. and Shotland, R. L. (1990). Valence of anticipated evaluation and social facilitation. In: *Journal of Experimental Social Psychology* 26.1, pp. 82–92.

Schein, E. H. (2010). *Organizational culture and leadership*. Vol. 2. John Wiley & Sons.

Schein, E. H. and Bennis, W. (1965). Personal and organizational change via group methods.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Vol. 5126. Basic books.

Schrage, M. (1993). The culture (s) of prototyping. In: *Design Management Journal (Former Series)* 4.1, pp. 55–65.

Senge, P. (1990). The fifth discipline: The art and science of the learning organization. In: *New York: Currency Doubleday*.

Sethi, R., Smith, D. C., and Park, C. W. (2001). Cross-functional product development teams, creativity, and the innovativeness of new consumer products. In: *Journal of Marketing Research* 38.1, pp. 73–85.

Shalley, C. E. and Gilson, L. L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. In: *The Leadership Quarterly* 15.1, pp. 33–53.

Sitkin, S. B. (1992). Learning through failure-The strategy of small losses. In: *Research in organizational behavior* 14, pp. 231–266.

Sosik, J. J., Kahai, S. S., and Avolio, B. J. (1998). Transformational leadership and dimensions of creativity: Motivating idea generation in computer-mediated groups. In: *Creativity Research Journal* 11.2, pp. 111–121.

Sosik, J. J., Kahai, S. S., and Avolio, B. J. (1999). Leadership style, anonymity, and creativity in group decision support systems: The mediating role of optimal flow. In: *The Journal of Creative Behavior* 33.4, pp. 227–256.

Spradley, J. P. (1979). The ethnographic interview. In:

Staw, C. J. N. B. M. and Nemeth, C. (1989). The Tradeoffs of social control and innovation in groups and organisations. In: *Advances in experimental social psychology* 22, pp. 175–210.

Sternberg, R. J., O'Hara, L. A., and Lubart, T. I. (1997). Creativity as investment. In: *California Management Review* 40, pp. 8–21.

Thomke, S. (2001). Enlightened experimentation: The new imperative for innovation. In: *Harvard Business Review* 79.2, pp. 66–75.

Thomke, S. (2003). R&D comes to services. Bank of America's pathbreaking experiments. In: *Harvard Business Review* 81.4, pp. 70–9.

Thomke, S. and Reinertsen, D. (1998). Agile product development: managing development flexibility in uncertain environments. In: *California management review* 41.1, pp. 8–30.

Thomke, S., Von Hippel, E., and Franke, R. (1998). Modes of experimentation: an innovation process?and competitive?variable. In: *Research Policy* 27.3, pp. 315–332.

Thomke, S. H. (1998). Managing experimentation in the design of new products. In: *Management Science* 44.6, pp. 743–762.

Tierney, P., Farmer, S. M., and Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. In: *Personnel Psychology* 52.3, pp. 591–620.

Tuulenmäki, A. and Välikangas, L. (2011). The art of rapid, hands-on execution innovation. In: *Strategy & Leadership* 39.2, pp. 28–35.

Tyler, T. R. and Lind, E. A. (1992). *A relational model of authority in groups.* Academic Press.

Vincent, A. S., Decker, B. P., and Mumford, M. D. (2002). Divergent thinking, intelligence, and expertise: A test of alternative models. In: *Creativity research journal* 14.2, pp. 163–178.

Vincenti, W. G. (1990). What engineers know and how they know it: Analytical studies from aeronautical history. In:

Waldman, D. A., Bass, B. M., and Yammarino, F. J. (1990). Adding to contingent-reward behavior the augmenting effect of charismatic leadership. In: *Group & Organization Management* 15.4, pp. 381–394.

Yin, R. K. (1989). Case Study Research: Design And Methods (Applied Social Research Methods) Author: Robert K. Yin, Publisher: Sage Publicat.

Yin, R. K. (2014). *Case study research: Design and methods.* Sage publications.

Yukl, G. A. (2002). Leadership in organizations. In:

Appendices

List of Appendices

A Introduction poster

This poster was given to all units of KVPS as an introduce to the experimentation.

B Idea formula

Participants of the experimentation challenge were asked to report experiments via this formula.

Idealomake

Päivämäärä	
Osasto / yksikkö	
Yhteyshenkilö	
Yhteyshenkilön email / puhelinnumero	

Idean nimi
- Nimeä ideasi tai kehitysehdotuksesi

Idean kuvaus
- Mihin tarpeseen, tavoitteeseen tai ongelmaan ideasi liittyy?
- Kuvittele, että ideasi on jo käytössä ja toimii hienosti. Mitkä asiat ovat muuttuneet?

Kokeilujen kuvaus
- Kerro lyhyesti käytännön kuvaus
- Jos olet kokeillut ideaa usealla eri tavalla, kerro lyhyesti jokaisesta kokeilusta

C Interview questions

The interview questions are presented below.

Background

* Work description, and how long has the interviewee been in the position?

Know-how

* What experiments did you do during the experimentation challenge?
* What idea did you work on further?
* How did you progress? What did you do?
* Did you develop the idea and conducted an experiment alone or together with colleagues? Did this deviate from your conventional way of working?

* What did you find easy? (What made it easy?)
* What did you find difficult? (What made it difficult?)
* Did something surprising or unexpected happen?
* How did you act in this situation?
* What do you personally consider as critical incidents during the experimentation challenge ? eg. What excited you or discouraged?
* Where do you think you succeeded? (Why?)
* What made an experiment successful? How do you know that an experiment was successful?
* What affected to the success of the experiment? What were the conditions?
* What went wrong from your perspective? Where did you consider failing? (Why?)
* What made an experiment unsuccessful?
* What affected or caused an experiment to fail?
* Can you describe some idea that you experimented during the experimentation challenge.
* How would you continue developing this idea?
* What would you do this time differently than in the first experiment?

Supporting structures and practices

* How did the experimentation challenge differ from the conventional way of improving ideas?

* Have you developed through experimenting before? Is it part of daily routine?
* How did experiments affect normal working day and routines?
* To whom did you tell about experiments?
* How did you document the experiments?
* How do you collect feedback from experiments?

Climate

* How was the climate of your work unit during the experimentation challenge?
* What affected?
* Were everybody equally involved?
* Did everybody speak up about their ideas?
* Were there conflicts? What were the effects of conflicts?
* What kind of support did you get in experimenting from your organisation/your colleagues?
* What kind of support you would have wished?
* Is there some specific thing preventing experimenting generally in your work?
* What usually happens after telling out an idea? (Do you get support and encouragement and start acting?)
* How failed experiments are dealt with in your team?

Leadership behaviour

* How immediate superiors react on new ideas and experimenting?
* Is time allocated for ideating and experimenting in your work?

Managing experimentation

* Do you feel that through experimenting you have more autonomy and you can affect better on your own work? Is experimenting one way to affect your work and improve it?
* During the experimentation challenge, did you get more ideas than usually? How did they emerge?

Psychological factors

* What kinds of emotions rose during experimenting? (Did you for instance feel frustrated, insecure etc.)
* How did it feel to tell an idea out loud among a team? (Did you get support or was your idea rejected?)

* How do you face a failed or unfinished experiment? (If there were any experiments like that)
* What did you get from the experience of experimentation challenge?
* What kind of factors brought good feeling?
* What kind of factors brought you down or caused anxiety somehow?
* How the amount and quality of feedback differs from when developing through experimenting?
* How do you consider feedback? (Does it encourage to develop an idea further? Did it bring you down?)
* How does experimenting affect your own learning and developing your work?

Wrap-up

* Do you have any questions or comments?